Scientific Evidence for Lifestyle Medicine

Update 2026

March 2026

LIFESTYLE4HEALTH
Nederlands Innovatiecentrum
voor Leefstijlgeneeskunde

Coalitie
Leefstijl in de Zorg

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Summary

This knowledge bundle explains why treatments that focus exclusively on diseases and medical interventions have a more lasting effect when lifestyle factors – such as nutrition, exercise, smoking, alcohol, sleep and stress – are taken into account in an integrated manner. A healthy lifestyle can help patients avoid preventable treatments and hospital admissions, reduce medication use, limit complications and promote recovery and functional health.

By structurally integrating lifestyle into healthcare and policy, the Netherlands can achieve sustainable health gains while simultaneously reducing healthcare costs. This means:

- **For patients:** better health, fewer symptoms, recovery and maintenance of functioning, greater self-management
- **For the healthcare system:** less avoidable care, lower healthcare costs, more effective use of resources
- **For society:** greater participation, less absenteeism due to illness, lower social costs

The authors call on patient organisations, healthcare professionals, healthcare organisations, knowledge institutions and policymakers to utilise the knowledge contained in this bundle and to jointly **accelerate the transition from illness & care to health & behaviour**.

This updated version of the knowledge bundle 'Scientific Evidence for Lifestyle Medicine' was created in collaboration with Lifestyle4Health and the Research Team of the Lifestyle in Healthcare Coalition (Coalitie Leefstijl in de Zorg). This knowledge bundle provides an up-to-date overview of the scientific evidence for the implementation of lifestyle within and from healthcare. It is not a systematic review, but a **practical compilation of knowledge about how lifestyle can contribute to the treatment and recovery of people with various symptoms or conditions**, referred to in this bundle as patients. The bundle focuses on both physical and mental symptoms or conditions and on the care provided in primary care, hospitals and mental health care.

The document builds on the earlier publication of Lifestyle4Health in 2019, which positions lifestyle as an integral part of curative care for people with physical or mental symptoms in order to prevent avoidable care, increase personal control, and make the healthcare system future-proof. The focus is therefore not on primary or universal prevention but on care for people with an increased risk of disease (e.g. obesity, cardiometabolic risk and/or hypertension), people who are ill or people who are experiencing symptoms (related and indicated prevention).

In view of developments over the past five years, lifestyle is presented in this document as a an established option within the treatment process alongside medical interventions such as medication and surgery. The updated version focuses on an **integrated approach**: not only looking at illness and treatment, but also at maintaining and improving health. There is also explicit attention for **individual, organisational and systemic interventions** that support the implementation of lifestyle medicine as part of routine healthcare.

A revision of the Scientific Evidence for Lifestyle Medicine knowledge bundle is necessary because lifestyle is a dynamic theme in which important developments have taken place over the past five years. In science, policy and practice, there is growing interest in lifestyle medicine and an increasing number of initiatives are being developed. With this knowledge bundle, the initiators aim to make a contribution to further strengthening this interest and thereby supporting and accelerating the transition from illness to health.

The urgent transition from illness & care to health & behaviour

Non-communicable, chronic and often lifestyle- and environment-related conditions and diseases, such as dementia, cancer and cardiovascular disease, have dominated healthcare demand in the Netherlands and worldwide for decades. Due to ageing populations and the increasing number of people with chronic diseases, healthcare expenditure is expected to rise from € 113 billion in 2022 to € 202 billion in 2050, with hospital care continuing to account for the largest share.

As long as these diseases are treated solely from a disease perspective while lifestyle factors – such as nutrition, exercise, smoking, alcohol, relaxation, sleep and stress – are not an integral part of the approach, treatments will often not be sustainably effective. Lifestyle is therefore also part of many guidelines. This aligns with **Appropriate Care**: care that works and in which the patient and care provider decide together, with less focus on disease and treatment and more focus on health and what someone can do. At the same time, it underlines the need for the transition from disease & care to health & behaviour. However, this transition is complex and challenging, partly because health and behavioural/lifestyle change is a complex societal and social issue that largely takes place outside the healthcare sector. This makes the transition from illness to health in healthcare a challenge: preventing problems, strengthening health and helping people to function as well as possible within their own capabilities. Lifestyle is an appropriate part of this – in the conversation, in joint decision-making and, if necessary, in treatment or aftercare.

Lifestyle as the foundation of health – also in healthcare

A healthy lifestyle is a fundamental part of maintaining and restoring health. More than 60% of Dutch people want to live healthier lives and a majority believe that healthcare should be organised differently, with more attention paid to lifestyle. Research by the Lifestyle in Healthcare Coalition shows that many patients actively seek lifestyle information and expect healthcare professionals to discuss this with them. Healthcare professionals also consider this important, but lifestyle often remains an unspoken topic in the consultation room.

If lifestyle is not part of the conversation and treatment, many people with symptoms run the risk of ending up in a medical revolving door: from consultation to consultation, from medication to medication, from treatment to intervention, without any lasting improvement in their health. Through various underlying mechanisms, an unhealthy lifestyle influences the development of many conditions and diseases that currently dominate healthcare, as well as their worsening, including increasing the risk of complications and comorbidities. Conversely, a healthy (or healthier) lifestyle can contribute to maintaining or restoring health. In 2022, the Dutch Integral Care Agreement (Integraal Zorgakkoord, IZA) therefore stipulated that **'lifestyle is an integral part of care for people with a symptom, condition or disease'**. The Dutch Supplementary Care and Wellbeing Agreement (Aanvullend Zorg- en Welzijnsakkoord, AZWA) also underlines its importance. This goes beyond nutrition, exercise, smoking, alcohol and sleep: relaxation, social connectedness (e.g. support from the social network), poverty reduction, well-being and sense of meaning are also part of it. Lifestyle is broader than individual interventions and requires an integral approach within healthcare.

Added value of lifestyle in diseases, scientifically substantiated

What are the concrete benefits of a healthier lifestyle for individuals, the healthcare system, and society? Lifestyle interventions demonstrably improve quality of life, self-management and health in people with chronic conditions. There is growing evidence that lifestyle also has a positive impact on clinical outcomes:

- **Type 2 diabetes**: various lifestyle programmes lead to remission, weight loss and reduced medication use.
- **Cardiovascular disease**: a healthy lifestyle lowers blood pressure, improves cholesterol levels and reduces the risk of complications.
- **Obesity**: interventions lead to lasting weight loss and improved metabolic health, reducing the risk of complications.
- **Cancer**: a healthy lifestyle can reduce the risk of certain types of cancer, improve treatment outcomes and reduce the chance of recurrence.
- **Mental health conditions**: physical activity is effective for mild to moderate depression and lifestyle interventions help with anxiety symptoms.
- **Dementia and cognitive decline**: a healthy lifestyle offers the prospect of reducing the risk and slowing cognitive decline.
- **Chronic pain and musculoskeletal disorders**: a healthy lifestyle can reduce pain and improve functioning.

In addition to this disease-specific list, it is more generally true that **quitting smoking** has a direct positive effect on surgical, cardiovascular and respiratory treatment outcomes, making it one of the most cost-effective interventions in clinical practice. In addition, lifestyle changes can also offer people with complex conditions much hope for recovery/improvement and a lower risk of complications. However, research shows that lifestyle changes often require (long-term) guidance or support.

Lifestyle also adds value to health

For people with a symptom, condition or illness, healthcare is not always about cure but about functioning optimally within their own capabilities. It has been proven that a healthier lifestyle contributes to a better quality of life, physical and psychosocial functioning, mental health, social connectedness and reintegration. These are outcomes that are very important and have a major impact at both the individual and societal levels. **The impact of lifestyle within and from healthcare can be increased if these broader health outcomes are taken into account in practice, policy, research and innovation, for example in choice of packages, goal-oriented research and policy prioritisation**.

Lifestyle is not an individual task for a patient

Although it is up to 'the patient' to make lifestyle changes, it is incorrect to view this solely as the individual responsibility of the person with a symptom or illness. Health behaviour is determined by the complex interaction of personal, social, economic and environmental factors. Choices about nutrition, exercise, sleep and substance use, for example, are influenced by income, housing, education level, working conditions, availability of resources, access to care and social support. Exposure to advertising and the widespread availability of unhealthy products and services also play a role. A supportive environment plays a crucial role and is necessary at all times. This is why an **integrated approach** is necessary. In addition, a new perspective on **system change** is needed: a perspective in which behavioural change is not only seen as an individual responsibility, but is embedded in the context, policy, environment and society. This requires systemic change in the broad context of the living environment to ensure health in all policies. But the healthcare environment itself must also change. A healthcare environment that supports a healthy lifestyle means making lifestyle discussable, actively providing

reliable information about lifestyle, referring patients where necessary and, where appropriate, using lifestyle interventions as part of regular care. But it also means a healthcare environment with healthy food options, which encourages exercise during visits or hospitalisation and is smoke-free.

Structural changes necessary

Despite growing evidence, the implementation of lifestyle changes within and from healthcare lags behind in practice. Structural changes are necessary to embed lifestyle as an equally important part of (appropriate) healthcare. In this bundle, we discuss, among other things:

- **Implementing what works**: the focus on lifestyle in healthcare is not yet structurally embedded. In practice, we see more and more examples of patients actively searching for information on what they can do themselves, as well as healthcare providers that support them in this in an appropriate manner. However, 'teachable moments' are not yet being exploited systematically, lifestyle discussions are not yet a structural part of care pathways, and clear, accessible information about lifestyle and (referral to) appropriate guidance is often lacking.
- **Stopping what doesn't work**: at the same time, it is necessary to phase out treatments or routines that contribute little to the quality of care or health. Without a balance between implementation and de-implementation, the healthcare landscape becomes overcrowded and the desired shift towards appropriate care stagnates. This requires collaboration between patient organisations, healthcare providers, policymakers and researchers, and should be based on current scientific insights and patient wellbeing.
- **Making lifestyle interventions accessible to everyone**: to date, (too) many lifestyle interventions and prevention campaigns have failed to adequately address the varying levels of health literacy within the population. To ensure more equal opportunities in health, lifestyle interventions within and from healthcare must also be understandable, accessible and applicable to everyone – regardless of educational level, language skills or background.
- **Working on appropriate research and evidence**: the current focus on individual diseases and randomised controlled trials (RCTs) with limited outcome measures is poorly aligned with practice, which is often more complex. Furthermore, there is an imbalance in research funding between pharmaceutical and medtech innovations and lifestyle interventions. Within the scientific community, a broader and more context-oriented approach to research on the effect and implementation of lifestyle interventions is needed. This will ensure that existing evidence can be used as effectively as possible. This will contribute to an acceleration of implementation and upscaling.
- **Working from a systems approach**: lifestyle change is a systemic issue; there is no single solution. Not in healthcare and not in the broader living environment. Lifestyle within and from healthcare requires the active organisation of collaboration across domains and sectors – at the level of individual professionals and daily appointments and at the level of administrators and long-term strategy. Just as a supportive living environment requires vision, policy focused on health in all policies and cooperation between municipalities, policymakers, employers, welfare organisations, educational institutions, citizen/patient organisations, healthcare organisations, etc.

Accelerating the transition together

The challenges facing healthcare today and tomorrow underscore the importance and urgency of the transition from illness and care to health and behaviour. With this knowledge bundle, the authors and parties involved wish to confirm that focusing on lifestyle plays an important role in this. It offers great opportunities to keep non-avoidable healthcare accessible by preventing avoidable care.

In recent years, partly as a result of the Lifestyle in Healthcare Coalition, major steps have been taken to to integrate lifestyle more prominently into curative care:

- More and more patients want to know what they can do themselves to be less ill and more and more healthcare providers want to and are able to support patients in this in an appropriate way
- More and more patients, healthcare professionals and scientific studies are recognising that lifestyle is of great value.
- There is broad consensus among the IZA/AZWA parties on the urgency of attention to lifestyle and there is movement in the system: healthcare providers are becoming involved, lifestyle is becoming firmly established in guidelines, policy and implementation.

The transition to health and behaviour is thus in the so-called **breakthrough or acceleration phase**, but the tipping point has not yet been reached. Health and lifestyle are not yet self-evident and an integral part of healthcare.

The insights from this knowledge bundle underline that the transition must be actively driven and accelerated: the added value of lifestyle for people and society is significant. It is necessary for all parties involved to move beyond the phase of pilot studies and projects. Lifestyle within and from healthcare must be integrally embedded in the system of appropriate care and in regional cooperation. The initiators of this bundle therefore call on patient organisations, healthcare professionals, healthcare organisations and policymakers to utilise the knowledge contained in this collection of scientific evidence to benefit their own institutions, while simultaneously working together to accelerate the transition.

1. Foreword

This bundle explains why treatments that focus exclusively on diseases and medical interventions are often not sustainably effective when lifestyle factors – such as nutrition, exercise, smoking, alcohol, sleep and stress – are not taken into account in an integrated manner. A healthy lifestyle can help patients to avoid preventable treatments and hospital admissions, reduce medication use, limit complications and comorbidities, and promote recovery and functional health outside of healthcare.

The bundle emphasises that investing in lifestyle medicine pays off, both in terms of health and financial impact:

- **For the patient**: better health, fewer symptoms, recovery and maintenance of functioning, greater self-management.
- **For the healthcare system**: less avoidable care, lower healthcare costs, more effective use of resources.
- **For society**: greater participation, less absenteeism due to illness, lower social costs.

By structurally integrating lifestyle into healthcare and policy, the Netherlands can achieve sustainable health gains while simultaneously reducing healthcare costs.

In 2022, the National Health Care Institute (Zorginstituut Nederland) reported that almost 70% of all Dutch people are in favour of reorganising healthcare in order to keep it high-quality, accessible and affordable. The majority of those surveyed felt that more attention should be paid to promoting a healthy lifestyle. The National Health Care Institute concludes that there is strong support in society for 'appropriate care', an approach to ensure that everyone can continue to receive good care in the future. Appropriate care is care that works and in which the patient and healthcare provider make decisions together, with less focus on illness and treatment and more emphasis on health and what someone *can* do (National Health Care Institute, n.d.). Where it is evident that 'prevention is better than cure', lifestyle interventions can also contribute significantly to recovery and quality of life in patients with a condition. The Dutch Integral Care Agreement (Integraal Zorgakkoord, IZA) therefore stipulates that 'lifestyle is an integral part of care for people with a symptom, condition or illness'. The Dutch Supplementary Care and Wellbeing Agreement (Aanvullend Zorg- en Welzijnsakkoord, AZWA) also underlines its importance. This concerns lifestyle in a broad sense; it is not only about nutrition, exercise and sleep, but also about smoking, alcohol and aspects such as relaxation, social connectedness (e.g. support from the social network), poverty reduction, wellbeing and sense of meaning.

More and more patients are looking for information about lifestyle and expect to find this in healthcare. A study by the Lifestyle in Healthcare Coalition in 2023 shows that 89% of the 4,484 patients surveyed have already looked up information about lifestyle (Lifestyle in Healthcare Coalition, 2023). A poll by the Dutch Federation of Cancer Patient Organisations (Nederlandse Federatie van Kankerpatiëntenorganisaties, NFK) confirms this picture, with approximately 75% of people living with cancer searching for information about lifestyle themselves and 77% indicating that they have tried to improve their health through lifestyle changes (Dutch Federation of Cancer Patient Organisations, 2024). Furthermore, a 2022 study by the National Health Care Institute shows that approximately two-thirds of respondents (completely) agree that general practitioners should address unhealthy lifestyles with their patients (National Health Care Institute, 2022).

People therefore want to know what they can do themselves to improve their health, alleviate symptoms and/or treat illness. They also like to discuss this with their healthcare professional. A study by the Lifestyle in Healthcare Coalition, in collaboration with the Knowledge Institute of the Dutch Association of Medical Specialists (Kennisinstituut van Medisch Specialisten, KIMS), shows that 81% of patients and 91% of healthcare providers consider lifestyle discussions to be (very)

important (Lifestyle in Healthcare Coalition & Dutch Association of Medical Specialists, 2025). However, 50% of patients indicate that lifestyle is not discussed. People also indicate that the most important reason why they, as patients, themselves are not initiating a lifestyle discussion is that they rely on the information provided by their healthcare provider. A survey by the Dutch Federation of Cancer Patient Organisations (NFK) shows that seven out of ten people living with cancer want to discuss at least one lifestyle topic with their healthcare provider, but 44% indicate that the importance of a healthy lifestyle has not been discussed (Dutch Federation of Cancer Patient Organisations, 2024).

Healthcare professionals want to help patients but lack the means to do so. A study by Koepel Artsen Maatschappij + Gezondheid (KAMG), in collaboration with the Lifestyle in Healthcare Coalition, shows that healthcare providers experience a lack of time, knowledge, skills and support from policy, guidelines and protocols (Koepel Artsen Maatschappij + Gezondheid, 2025).

Healthcare providers are uncertain about referral options and afraid of coming across as intrusive or accusatory. Guidelines and their use have been examined in detail by the Lifestyle in Healthcare Coalition, in collaboration with various scientific associations. The review shows that lifestyle is addressed in 66% of the guidelines on common conditions, but often without a concrete course of action for the healthcare provider (Lifestyle in Healthcare Coalition & Dutch Association of Medical Specialists, 2024). Only 54% of healthcare providers are (very) satisfied with the lifestyle consultation; 16% are dissatisfied. Additional research into the application of these recommendations in practice shows that patients and healthcare providers consider the lifestyle consultation to be (very) important. Healthcare providers indicate that lifestyle recommendations in guidelines are not always helpful in practice, with half of patients stating that lifestyle is not discussed.

In order to better utilise lifestyle as part of appropriate care, it is important for all parties to have insight into the scientific evidence for lifestyle in healthcare. This knowledge bundle provides an up-to-date overview of the scientific evidence for lifestyle interventions in various conditions. This knowledge bundle builds on the foundation laid in the previous edition in 2019 (Molema et al., 2019). At that time, an important foundation was laid for the broad recognition of lifestyle (medicine) as a crucial key to reducing the burden of disease and lowering healthcare costs within curative care. Since then, the scientific evidence for the effectiveness of lifestyle interventions has grown further, resulting in lifestyle being increasingly integrated into healthcare.

Structure of this bundle

This knowledge bundle consists of two main sections: the disease perspective (Chapter 3) and the health perspective (Chapter 4). The first section discusses how lifestyle interventions can contribute to appropriate care for specific conditions, such as cardiometabolic disorders, cancer, musculoskeletal disorders, dementia and mental health. The underlying biological mechanisms that play a role in these conditions are discussed, as are the effects of lifestyle interventions. This part emphasises how lifestyle can be used to support recovery, treatment and the prevention of complications.

The second part approaches lifestyle from a health perspective and emphasises resilience and sustainable behavioural change as part of appropriate care. Topics such as prehabilitation, recognised lifestyle interventions, teachable moments and social networks are discussed. Attention is also paid to health skills and providing reliable information to support a healthy lifestyle. Finally, interventions in the organisation of care, such as the lifestyle (care) desk and ‘the other conversation’ are explained. The bundle concludes with overarching findings and implications for practice and policy, as well as the opportunities and challenges for the future of lifestyle medicine.

2. Introduction and objective

As with the first version of the knowledge bundle from 2019, this version also focuses on the use of lifestyle as part of appropriate, curative care: from the early detection and treatment of diseases, to improving quality of life, preventing the worsening of existing symptoms or conditions, and limiting comorbidities (Lifestyle4Health, 2019). The focus is therefore not on primary or universal prevention. This bundle concerns individual, organisational and systemic interventions focused on lifestyle as part of care for people who are at risk of disease (e.g. people who are overweight and have cardiometabolic risk and/or hypertension), are already ill or are experiencing symptoms. Lifestyle is one of the options that patients and professionals can decide on together, alongside medical care such as medication and surgery. The bundle takes an integrated approach by looking not only at disease – how can it be treated and reduced? – but also at how the health of people who are at risk, already ill or experiencing symptoms can be maintained and improved.

Whereas the previous knowledge bundle from 2019 was an initial compilation of available knowledge about the potential of lifestyle in and for healthcare, this document is an update in which we present the progress and new insights gained since then. The scientific evidence that lifestyle interventions successfully contribute to health and disease management is growing stronger every year. Studies demonstrate the added value of lifestyle interventions in stabilising or even reducing diseases. At the same time, it is becoming increasingly clear that lifestyle interventions can play a key role in the prevention and treatment of diseases. The aim of this bundle is to provide a clear overview of the current scientific evidence for the effectiveness of lifestyle interventions in the most common diseases. This knowledge bundle is not a systematic review.

2.1 The importance of lifestyle within and from healthcare

Lifestyle change is a complex societal and social issue, which largely takes place outside the healthcare sector. For this reason, it is challenging to make lifestyle an integral part of discussions, joint decision-making and, where necessary, treatment or aftercare in the healthcare sector. However, partly due to the agreements on this subject in the IZA and the Healthy and Active Living Agreement, more and more (regional) parties are taking up the challenge and trying to give lifestyle an appropriate place in and from healthcare. For people with symptoms or illnesses, lifestyle is not just a supplement to their medical treatment. For healthcare professionals, too, lifestyle is not a side issue, but a core aspect of their medical practice.

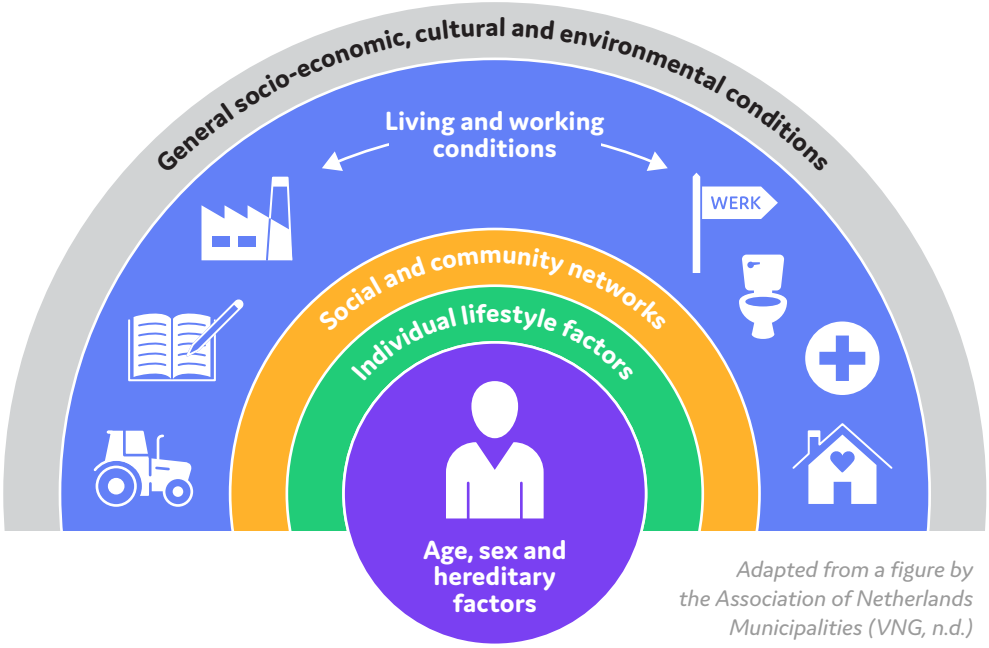
Lifestyle is a fundamental part of how we approach illness and health. If lifestyle is not part of the discussion and treatment, many people with symptoms run the risk of ending up in a medical revolving door: from medicine to medicine, from treatment to intervention, without any lasting improvement in their health. Meanwhile, focusing on lifestyle change is in line with the knowledge and preferences of the people concerned, as 36% of Dutch people want to eat healthier, 60% want to exercise more, over half of smokers want to quit, and 20% of the Dutch population is trying to lose weight (Kloosterman et al., 2023).

The urgency is further reinforced by the ageing population and the increasing number of people with chronic diseases (National Institute for Public Health and the Environment et al., 2024), which are leading to growth in demand for care, particularly for conditions such as dementia, cancer and cardiovascular disease. Healthcare expenditure is predicted to rise from 113 billion in 2022 to 202 billion in 2050. As in 2022, most of the money will go to hospital care in 2050 (National Institute for Public Health and the Environment et al., 2024).

Interventions at the individual, population, organisational and system levels that focus on lifestyle have promising potential in preventing avoidable care and reducing unnecessary care so that unavoidable care remains accessible and affordable in the future. It also enables people to take more control of their own health, allowing them to remain healthy and enjoy a higher quality of life for longer and to continue to participate in society. This makes lifestyle medicine valuable not only for individuals, but also for the sustainability of the healthcare system, strengthening economic productivity and delivering social benefits (Netherlands Bureau for Economic Policy Analysis, 2025; Sagner et al., 2014; Wouterse et al., 2025).

Although it is up to the patient to make lifestyle changes, it is important to emphasise that changing one's lifestyle is not solely an individual task for the patient. Health behaviour is determined by the complex interaction between people and their environment, influenced by individual, socio-economic and commercial factors. Health problems are often the result of factors such as debt, unemployment and poor housing conditions, which mainly affect vulnerable groups, such as people with a low socio-economic status. Structural health improvement requires an integrated approach in which sectors within and outside public health work together at all levels: administration, policy and implementation. The model developed by Dahlgren and Whitehead (Dahlgren & Whitehead, 1991) emphasises how various determinants, such as socio-economic conditions and living environment, influence our health (Figure 1).

Figure 1. Comprehensive health policy based on the Dahlgren and Whitehead model



Adapted from a figure by the Association of Netherlands Municipalities (VNG, n.d.)

Emphasising personal responsibility is therefore far too limited; a supportive environment plays a crucial role and is necessary at all times. Environments are therefore central to the new prevention strategy (Government of the Netherlands, 2025). Healthcare is also an important environment that can provide support. This means discussing lifestyle, referring patients where necessary, and, where appropriate, using lifestyle interventions as part of regular care. It also means providing healthy food options within and outside healthcare organisations, encouraging exercise during visits or hospitalisation, smoke-free healthcare organisations, etc.

2.2 A systemic approach to a healthy context

Lifestyle behaviour does not arise in a vacuum. Choices about nutrition, exercise, sleep and substance use are influenced by a multitude of environmental factors, social circumstances and structural conditions. These include income, housing, level of education, working conditions, availability of healthy food, access to healthcare and social support. These 'determinants of health' are unevenly distributed in society and are often beyond the direct influence of the individual. Commercial interests also play a role in the lifestyle choices that people make every day. These 'commercial determinants of health', such as the availability and promotion of unhealthy products such as sugary foods, tobacco and alcohol, form a structural counterforce to public health goals (Gilmore et al., 2023; WHO Regional Office for Europe, 2024). These forces are deeply rooted in society and influence behavioural choices in ways that are not always visible or conscious.

A fair and effective approach to lifestyle change requires attention to the context in which people live and make choices. Without taking that context into account, there is a risk that lifestyle interventions will mainly reach people who already have relatively good health literacy and resources, while those with the greatest health disadvantages will not be adequately reached. This could inadvertently further increase health inequalities.

For this reason, lifestyle medicine requires a systemic approach: a perspective in which behavioural change is not only seen as an individual responsibility, but is embedded in policy, healthcare, the environment and society. The concept of 'health in all policies' underlines this: health must be an explicit consideration in all policy sectors, from spatial planning to education and from labour market policy to food supply (Social and Economic Council, 2023). A systems approach requires cooperation between healthcare professionals, local authorities, education, employers, policymakers and citizens. It means that interventions must focus not only on behaviour but also on removing structural barriers, strengthening environmental factors that promote healthy behaviour and creating inclusive care and living environments. Although healthcare organisations themselves can also take important steps by adjusting routines, the layout of buildings and the range of food and drink on offer, as well as actively discussing lifestyle in treatment policy, promoting a healthy lifestyle requires more than this. In addition to the commitment of individuals and healthcare professionals, it also requires social change, political choices and policy measures that make healthy choices easier, more attractive and more self-evident. With support from this broader context, lifestyle-oriented care can be effective and contribute to sustainable health gains. In this bundle, we will not delve deeper into the necessary social changes or policy measures.

2.3 Lifestyle medicine as a contribution to the solution

Lifestyle medicine offers a powerful response to the challenges within the current healthcare landscape. By focusing on lifestyle not only in healthcare but also in the broader social context, we are paving the way for a more sustainable and future-proof healthcare system. Now, with increasing pressure on the healthcare system, it is time to further integrate lifestyle into daily healthcare practice. This bundle summarises the scientific insights so that the implementation of lifestyle within and from healthcare can be evidence-based. This is particularly relevant at a time when there is also a lot of misinformation.

3. Illness perspective: lifestyle medicine for specific diseases

The number of people with a chronic condition in the Netherlands will rise from 10.5 million to 12 million between now and 2050, with lifestyle-related age-related diseases becoming increasingly prominent in the top ten. Multimorbidity – multiple conditions at the same time – will also increase significantly. By 2050, a larger proportion of this group will have three or more conditions, with an increase from approximately 1 million to 4.3 million people (National Institute for Public Health and the Environment, 2024).

This increasing prevalence of chronic conditions and multimorbidity requires appropriate care. This means that treatment and support, including lifestyle and health, are tailored to the specific disease, stage of life and personal situation of the patient. Where possible, care is organised close to the patient, is effective and affordable, and patients decide together with their doctor on the best possible treatment. Appropriate care focuses not only on disease but also on health, strengthening what a person can do and improving quality of life, slowing disease progression and preventing complications (National Health Care Institute, n.d.). From the disease perspective, lifestyle interventions are systematically used as a treatment option, both independently and in combination with standard care.

This chapter explains the essential role that lifestyle plays in the development of chronic conditions and multimorbidity, as well as in helping to prevent or delay the development of disease. It also explains how lifestyle can contribute to improving the quality of life of people with chronic conditions.

3.1 Underlying biological mechanisms

To understand the role of lifestyle in the progression of chronic diseases such as diabetes, obesity, cardiovascular disease, cancer, autoimmune diseases and neurodegenerative disorders, it is important to first consider the basics. Many of these diseases are driven by shared mechanisms. Biologically speaking, health rests on three essential pillars (López-Otín & Kroemer, 2021):

1) The maintenance of well-functioning structures and compartments, including the physical building blocks such as cells, tissues and organs, as well as the functional units that form these structures.
2) The maintenance of internal balance (homeostasis).
3) An adequate stress response.

When these systems become damaged or their capacity decreases or their mutual communication is disrupted, this can lead to illness. Each of these three pillars can be further subdivided into the nine core characteristics of health.

The pillar 'structures and compartments' revolves around the physical integrity of the body. Important components are **barriers**, such as the skin, the intestinal wall and the blood-brain barrier (characteristic 1) and the control of local damage, for example due to oxidative stress (too many free radicals) or **inflammatory reactions** (inflammation) (characteristic 2). An important phenomenon here is chronic low-grade inflammation, a prolonged, mild inflammatory response without a clear acute cause such as infection or injury. This form of inflammation can be caused by factors such as physical inactivity, unhealthy diet, stress and exposure to toxins. Chronic low-grade inflammation plays an important role in the development of chronic diseases such as cardiovascular disease, diabetes, cancer, kidney disease and neurodegenerative disorders (Furman et al., 2019). Oxidative stress caused by an excess of oxygen radicals also damages essential cell structures such as DNA

and lipids. This contributes to conditions such as atherosclerosis and Alzheimer's disease (Finkel & Holbrook, 2000).

The 'homeostasis' pillar revolves around processes that contribute to the body's ability to maintain internal stability. This includes the **breakdown and recycling of cellular components** (characteristic 3), **coordination between biological systems** such as the nervous system, immune system and endocrine system (characteristic 4) and **biological rhythms** such as the circadian rhythm (24-hour rhythm) (characteristic 5). An example of disrupted homeostasis is insulin resistance, in which cells no longer respond properly to the hormone insulin for glucose uptake. This often results in chronic low-grade inflammation, which disrupts the immune system and promotes fat storage, exacerbating metabolic disorders (Samuel & Shulman, 2012). Another example is that night workers are at greater risk of type 2 diabetes and cardiovascular disease due to disruption of the circadian rhythm. Menopause also illustrates a disruption of homeostasis: the decline in oestrogen and progesterone disrupts the hormonal balance, which can lead to hot flushes, sleep problems, mood swings, concentration problems, joint complaints and metabolic changes. In the long term, there is also an increased risk of osteoporosis, cardiovascular disease and type 2 diabetes (Mou et al., 2025; Nappi et al., 2022; Nelson, 2008).

The 'adequate response to stress' pillar concerns the body's ability to adapt during a period of stress. This includes **homeostatic resilience**, or the ability to recover after disturbances such as infections (characteristic 6); **hormetic regulation**, i.e. adaptation of physiology through regular exposure to mild stressors such as exercise, polyphenols and energy restriction (characteristic 7); and **tissue repair and regeneration** (characteristic 8). **Psychosocial adaptation** (characteristic 9) has also been very recently added to the latter category (López-Otín & Kroemer, 2024). This refers to the mental, social and economic ability to adapt to living conditions.

Figure 2. Links between psychosocial adaptation and eight proposed characteristics of health, grouped into three categories.

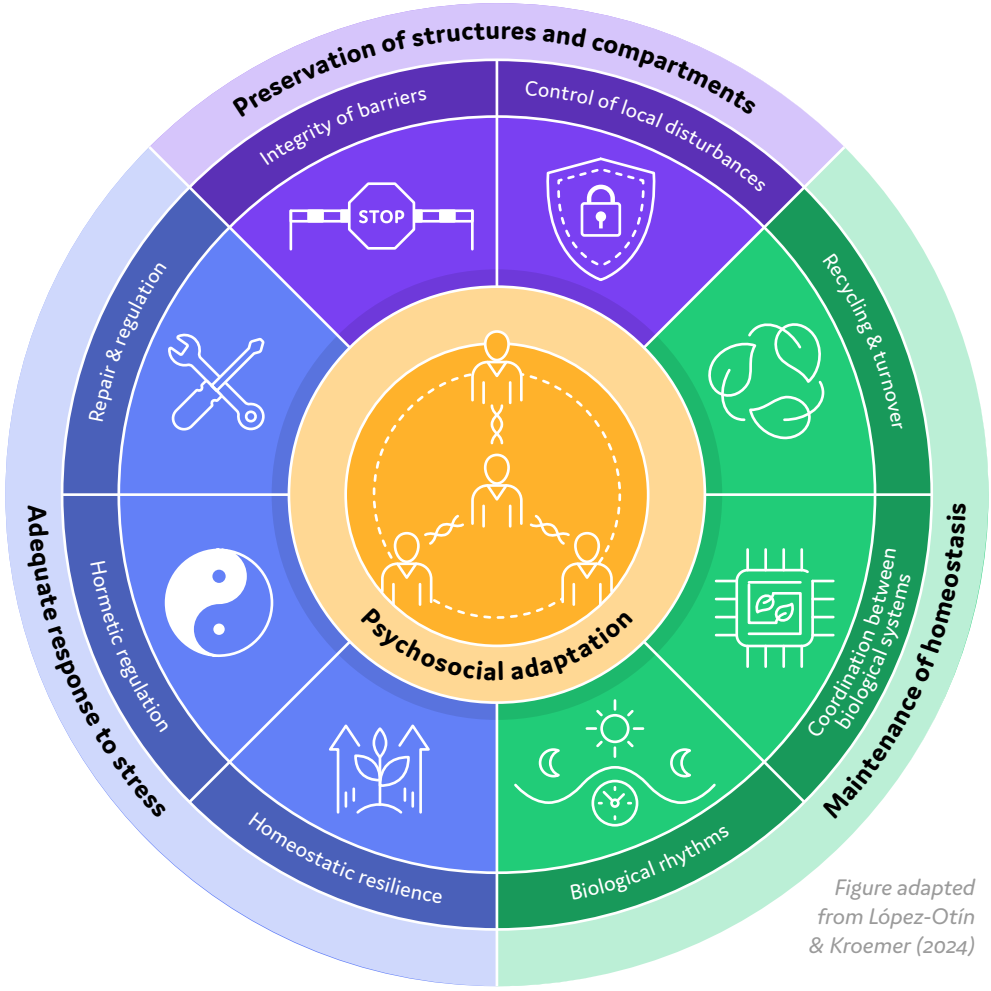


Figure adapted from López-Otín & Kroemer (2024)

Lifestyle can have a major influence on all nine of these core characteristics; on the one hand by maintaining health and on the other hand in the development and progression of disease.

Below, we discuss the underlying mechanisms that play a role in a number of lifestyle-related conditions: cardiometabolic disorders, cancer, musculoskeletal disorders, dementia and mental health disorders. We also show how lifestyle interventions can have a positive effect on these conditions.

3.2 Cardiometabolic disorders

Cardiometabolic disorders, such as type 2 diabetes, obesity and cardiovascular disease, are the leading cause of death worldwide (World Health Organisation, n.d.). Due to an ageing population and changing lifestyles, both the number of patients and the burden of disease continue to increase. In the Netherlands, more than 1.9 million people now live with one or more cardiometabolic disorders (Nutrition & Healthcare Alliance, n.d.-a; Dutch Association of Medical Specialists, n.d.). This growing group of patients not only places a heavy burden on public health, but also on healthcare costs and the organisation of healthcare.

Type 2 diabetes

Clinical picture and underlying mechanisms

In 2023, 51,000 new patients with diabetes were diagnosed by their general practitioner. The vast majority of these have type 2 diabetes, estimated at 91% (VZinfo, 2024c). In 2023, approximately 2,800 people died from type 2 diabetes (VZinfo, 2024b). Unlike type 1 diabetes, type 2 diabetes is a disease that is 90% caused by lifestyle (Willett, 2002). Type 2 diabetes is a systemic disease involving multiple organs. The disease is characterised by hyperglycaemia, or elevated blood glucose concentrations. At least eight organs are involved in regulating blood glucose alone, including the pancreas (production of glucagon and insulin, two hormones that work together to maintain blood sugar balance), muscles (involved in the uptake of glucose from the blood and glucose storage in the form of glycogen), the intestines (secretion of incretins for the regulation of blood glucose), the liver (which can produce glucose via gluconeogenesis), the brain (which uses large amounts of glucose and, when there is a shortage, switches to burning ketones), adipose tissue (which is closely linked to the liver for proper coordination of fat burning or fat storage via the action of insulin and glucagon) and the kidneys (which reabsorb glucose so that it does not simply leave the body) (DeFronzo, 2009). Type 2 diabetes is characterised by insulin resistance, which often arises from fat accumulation within the organs when the adipose tissue has insufficient capacity to store the supply of lipids (fatty substances). In insulin resistance, the body's cells respond less effectively to the hormone insulin, with the result that glucose is absorbed less effectively and continues to circulate in the blood (elevated blood sugar levels). If insulin resistance persists, the other organs involved in glucose homeostasis will also be affected to a greater or lesser extent. It is now clear that there are different subtypes of type 2 diabetes. These subtypes appear to differ in the biological cause of type 2 diabetes and in the complications that develop (Ahlqvist et al., 2018; van der Kolk et al., 2019). This may require a more tailored (lifestyle) treatment (van Ommen et al., 2018).

Effect of lifestyle interventions on these mechanisms

Reverse Diabetes2 Now (Keer Diabetes2 Om, KDO) is a combined lifestyle intervention that specifically targets people with type 2 diabetes. There are two versions of the programme: an online group programme for people with pre-diabetes and/or early-stage type 2 diabetes (without medication or treated with only metformin, DPP4 or GLP1) called KDO-Gecombineerde Leefstijlinterventie (Combined Lifestyle Intervention, KDO-GLI). And KDO-Plus, a physical version of the programme for people with type 2 diabetes who use medication beyond just metformin and which also includes intensive guidance on reducing diabetes medication. The aim of the KDO programmes is to reverse or bring type 2 diabetes into remission (to halt its progression) through sustainable behavioural change, whereby participants achieve healthy HbA1c levels (a measure of average blood glucose levels over the last 2-3 months) with no medication or reduced medication. The lifestyle programmes consist of an intensive six-month treatment phase and an 18-month aftercare programme. In the Netherlands, the programmes are covered by health insurance. They are effective in both the short and long term in reducing weight (-7.0 kg after two years), waist circumference (-7.9 cm) and body mass index (BMI; -2.4 kg/m2), reducing medication use (71% off insulin after two years), stabilising blood glucose and lowering blood lipids (triglycerides and total cholesterol/HDL ratio) (Pot et al., 2019, 2020). In addition, the quality of life and self-perceived health of the participants improved, and there are indications that dietary habits improved with lower carbohydrate consumption, lower energy intake and higher vegetable consumption (Pot et al., 2020, 2022). The loss of fat mass improves insulin sensitivity, allowing people with type 2 diabetes to control their blood glucose and lower their blood lipids with less medication or even without medication.

In addition, there is the **2Do** lifestyle programme (Centre for Healthy Living, n.d.-a). 2Do is a lifestyle intervention consisting of an intensive 13-week approach phase in which participants engage in intensive strength and interval training two to three times a week. The lifestyle themes of nutrition (with extra attention to protein intake), exercise, sleep, stress and relaxation are addressed in six group meetings and three individual meetings. The intensive approach phase is followed by a nine-month follow-up phase. This programme has shown that participants lose weight (-2.1 kg) while maintaining muscle mass. Fat mass decreases, while fat-free mass is maintained. Muscles are an important organ in the uptake of glucose from the circulation. Maintaining and even increasing muscle mass is therefore an important strategy in weight loss, especially in patients with type 2 diabetes. This intervention also shows improved insulin sensitivity in older people with type 2 diabetes. Muscle functionality increases. Weight loss with preservation of muscle mass and functionality is maintained even after nine months of follow-up (Memelink et al., 2020). Interestingly, protein enrichment appears to be particularly effective in type 2 diabetes patients who have muscle insulin resistance (Pasman et al., 2020).

The aim of the **National Walking Challenge** (de Nationale Wandeluitdaging) is to encourage people with (or at increased risk of) type 2 diabetes to exercise more regularly over a period of 20 weeks. Professionals from the healthcare, sports and welfare sectors organise weekly walking sessions for 20 weeks. This intervention is specifically aimed at improving quality of life and physical health by encouraging daily physical activity (Centre for Healthy Living, n.d.-b). Research shows that participants in the National Walking Challenge exercised more on average (55.4%), felt fitter and more relaxed (25.7% and 16.9% respectively), improved their blood glucose regulation and lost weight and waist-to-hip ratio on average (Bas van de Goor Foundation, n.d.).

Since 2023, **continuous glucose monitoring (CGM) in combination with personalised nutritional advice from a dietitian** (via digital consultation) has also been fully reimbursed by basic insurance for people with type 2 diabetes (Dutch Health

Hub, n.d.). Unfortunately, no scientific results have yet been published and no public effectiveness assessment of this approach is known, despite its inclusion in the basic insurance package.

Conclusion

There are now several proven effective lifestyle programmes for people with type 2 diabetes or prediabetes. Both the KDO programmes and 2Do have shown that participants lose weight in the long term, resulting in a loss of fat mass, which has positive effects on insulin sensitivity. Both the National Walking Challenge and the KDO programmes result in an increase in quality of life and perceived health among participants.

Obesity and weight-related diseases

In 2024, approximately half of Dutch people aged 18 and older were moderately overweight (also referred to as just overweight) or severely overweight (obese). Although obesity is a major risk factor for numerous conditions, there are also people with obesity who are relatively healthy, especially in the moderately overweight group (BMI 25-30 kg/m²). Overweight (BMI between 25-30 kg/m²) is more common in men than in women, but obesity (BMI ≥30 kg/m²) is more common in women. In 2024, almost 16% of Dutch people aged 18 and older were obese. These figures are based on self-reported height and weight data (VZinfo, 2025c).

Clinical picture and underlying mechanisms

Obesity

A BMI between 30 and 35 kg/m2 is classified as class I obesity, between 35 and 40 kg/m2 as class II obesity, and ≥ 40 kg/m2 as class III obesity (Dutch Association of Medical Specialists, 2025). There are several underlying mechanisms that can result in the development of obesity. In many cases, an unhealthy lifestyle and living environment will be a major cause of being overweight and/or obese (e.g. sleep deprivation, alcoholism, smoking cessation, and dietary and exercise habits). However, medical factors can also underlie the development of obesity. These can include abnormalities in a single gene, such as leptin deficiency, or syndromic forms in which multiple characteristics come together, such as Prader-Willi syndrome, estimated to account for about 5% of obesity prevalence (De Vries et al., 2017). Obesity can also be caused by an underactive thyroid gland. In addition, there are various hormonal changes or abnormalities that can lead to obesity, such as menopause, polycystic ovary syndrome (PCOS) or growth hormone deficiency. Obesity can also be caused by medication (especially psychiatric drugs, (local) corticosteroids, insulin and specific beta blockers; see also the overview in the guidelines on overweight and obesity of the Dutch Association of Medical Specialists, 2025) and mental disorders (such as depression, eating disorders and chronic stress). It is important to identify the cause of obesity (Check Oorzaken Overgewicht & Erasmus MC, n.d.; van der Valk et al., 2019) in order to provide targeted treatment, prevent unnecessary interventions and reduce complications.

If there is a disruption in the storage of fat in the adipose tissue, the fat cells can rupture, causing localised low-grade inflammation. This can then result in insulin resistance and cause type 2 diabetes. In addition, disrupted lipid production can lead to elevated levels of lipids in the blood, which can result in fatty liver disease, liver inflammation and liver fibrosis. In turn, this increases the risk of arteriosclerosis, high blood pressure and cardiovascular disease, stroke and chronic kidney disease. There is also increased mechanical stress, which can result in comorbidities such as sleep apnoea and osteoarthritis (Heymsfield & Wadden, 2017). Finally, there is often disturbed appetite signalling, which increases the risk of emotional eating and eating due to external stimuli (e.g. seeing or smelling food) (Kuckuck et al., 2023). This indicates that obesity is related to a whole range of clinical pictures.

Overweight individuals with moderate or significantly elevated weight-related health risk (WRHR) or metabolic syndrome

If overweight (BMI between 25 and 30 kg/m²) is combined with a waist circumference ≥102 cm for men and ≥88 cm for women and/or a comorbidity, this is an indication that there is a moderately increased weight-related health risk (WRHR) and people are also eligible for a combined lifestyle intervention (Federation of Medical Specialists, 2025). However, 90% of participants in the combined lifestyle intervention are people with obesity; people who are overweight and have a WRHR do not or hardly participate in the combined lifestyle intervention (Oosterhoff et al., 2024). Comorbidities include cardiometabolic complications such as insulin resistance, dyslipidaemia, metabolic syndrome, low-grade inflammation and hypertension (Federation of Medical Specialists, 2025). However, in the overweight group, factors such as waist circumference and additional diagnostics to identify cardiometabolic complications are often not determined, and people are often unaware that they have an elevated WRHR.

Metabolic syndrome is a bundle of risk factors that often occur together and significantly increase the risk of cardiovascular disease and type 2 diabetes. These risk factors include being overweight or having an increased waist circumference, high blood pressure, elevated blood sugar levels, high triglycerides and low levels of HDL cholesterol in the blood. If at least three of the five criteria are met, it is referred to as metabolic syndrome. In addition to being overweight, insulin resistance is an underlying biological mechanism in metabolic syndrome that corresponds to obesity and type 2 diabetes and can therefore be addressed with similar lifestyle interventions.

Obesity-related cancer

Obesity is also associated with several types of cancer, with 4-8% of cancers being related to obesity. Underlying mechanisms include the extra production of hormones by fatty tissue, hyperinsulinemia and higher concentrations of IGF-1, as well as chronic inflammation. The physiological changes resulting from obesity (fatty degeneration of organs, chronic low-grade inflammation and disturbed hormone levels) play a role in the development of cancer tumours (Pati et al., 2023). The extra body fat affects growth hormones that stimulate cell division, cause inflammation and produce the hormone oestrogen. This stimulates the cells in the breast and uterus to divide more frequently, which increases the risk of cancer (Kanker Behandeling & Preventie, n.d.). Breast, colon, fallopian tube, throat, pancreas, kidney, liver, gallbladder, uterine and thyroid cancer are more common in people who are obese (VZinfo, 2024d). Weight reduction therefore also helps people who are obese to reduce their risk of certain cancers.

Fatty liver diseases

Fatty degeneration of the liver (steatotic liver disease, SLD) has various degrees of severity, including metabolic dysfunction-associated steatohepatitis/steato liver disease (MASH/MASLD), which is also a disease related to being overweight and/or obese due to an excessive amount of fat. Obesity and insulin resistance are strongly associated with MASH, both through increased release of free fatty acids to the liver and through increased liver lipogenesis associated with hyperglycaemia and hyperinsulinaemia (Verschuren et al., 2024). Fatty liver disease (steatosis) is a gradual process and is often develops without symptoms. It can even develop into cirrhosis of the liver without any symptoms, a potentially irreversible process that causes damage and inflammation, resulting in scar tissue in the liver. This impedes blood flow to the liver and makes it impossible for liver cells to function. Because MASH is asymptomatic in its early stages, general practitioners and other

doctors are not particularly focused on diagnosing MASH (Castera et al., 2025). Nevertheless, it is important to screen people for MASH because it is often associated with being overweight/obese and diabetes (Hansen et al., 2025) and has a global prevalence of around 30% (Riazi et al., 2022). The severity of the disease and its prevalence underline the importance of early diagnosis. The use of non-invasive (blood) markers for the diagnosis of fatty liver disease is an effective way to speed up diagnosis (van Kleef et al., 2025; Verschuren et al., 2024). The recent finding that waist circumference is a predictive measure for MASH and MASLD is of great importance for healthcare practice (van Kleef et al., 2025). In the early stages of MASH, it is still possible to reverse the process by losing weight and thus ridding the liver of excess fat.

For various conditions related to obesity, fat storage in various organs (caused by excess fat) disrupts the functioning of various organs, leading to insulin resistance, inflammation of the cells in the fatty organ and disrupted blood values (high blood sugar, continuous low-grade inflammatory factors, elevated hormone levels). Addressing obesity through weight reduction can improve various comorbidities by reducing this fat storage.

Effect of lifestyle interventions on these mechanisms

The combined lifestyle intervention programme (GLI) helps people who are obese and people who are overweight with moderately or severely elevated WRHR to achieve a healthier weight through a healthier lifestyle, with a focus on nutrition, exercise, sleep and stress (Oosterhoff et al., 2024). Since 2019, 121,000 Dutch people have started the combined lifestyle intervention. The National Institute for Public Health and the Environment (Rijksinstituut voor Volksgezondheid en Milieu, RIVM) monitors the effects, including weight, waist circumference and quality of life. At the end of the GLI programme, participants had lost an average of 5% of their weight and their waist circumference had also decreased by 5%. Their quality of life improved noticeably, with an increase of 13 points on a scale of 0 to 100. Participants who lost more than 5% of their weight saw a greater improvement (15 points) than those who lost less weight (11 points). For 12% of participants, weight loss was partly due to medication, usually for diabetes. Only 1% used obesity medication, so no conclusions could be drawn about this. Participants without weight-loss medication lost an average of 4.4% of their weight, a small difference compared to the average for all participants (5%). This confirms that the GLI is effective regardless of medication use. The GLI leads to weight loss and a significant improvement in quality of life, showing that participants experience considerable health benefits. In people with class I obesity, additional medication, such as the new anti-obesity medication, may be considered if the GLI is not successful after one year.

Combined Lifestyle Intervention

An important lifestyle intervention that can be used in the transition to appropriate care is the Combined Lifestyle Intervention (Gecombineerde Leefstijlinterventie, GLI). A distinction can be made between the GLI (the combined lifestyle intervention as a recognised programme in the basic insurance package) and a combination of lifestyle interventions (a mix of separate interventions with a lifestyle focus but not integrated into a recognised GLI programme). Within this framework, we refer to the GLI. The GLI is a two-year programme aimed at sustainable lifestyle change, with the goal of a healthy lifestyle, better self-care and reduced health risks. A GLI usually consists of a combination of individual counselling and group sessions. These interventions typically focus on lifestyle-related chronic diseases, such as people who are (severely) overweight or have an increased health risk due to cardiovascular disease or diabetes.

The BeweegKuur, SLIMMER, CooL, Samen Sportief in Beweging, X-Fittt and Reverse Diabetes2 Now are the current recognised GLIs in the Netherlands (Centre for Healthy Living, 2025). Effective GLIs share several important characteristics. They use scientifically proven methods to encourage behavioural change, such as motivational interviewing. The approach is often multidisciplinary, with lifestyle coaches, dieticians, physiotherapists and other healthcare professionals working together. In addition, customisation and self-management are essential. The programmes are tailored to the participant's personal situation and participants are actively involved in the process. GLIs have been proven to be effective in improving health outcomes, such as weight loss and learning a healthier lifestyle. At the same time, there are also challenges. For example, participation in a GLI can be difficult for some people to maintain, especially in the long term. In addition, the implementation of these interventions in various healthcare settings requires clear agreements, sufficient resources and cooperation between professionals. Despite these challenges, GLIs offer many opportunities to contribute to the prevention and treatment of lifestyle-related conditions.

There are currently several accredited GLI programmes that focus on people living with class I obesity and/or overweight people with moderately or severely elevated WRHR, which are covered by basic health insurance. See Table 1 for an overview.

Effect of GLI on obesity-related conditions. The lifestyle intervention results described are based primarily on participants with obesity. Conditions related to obesity and being overweight, such as obesity-related cancer and fatty liver diseases, involve similar underlying mechanisms to obesity. These individuals also have the opportunity to participate in lifestyle interventions (RIVM, Centre for Healthy Living). Although not described, it is to be expected that the lifestyle interventions will also yield health benefits for them due to the influence of nutrition and exercise in particular on body weight and fat mass.
A comprehensive review of the effects of lifestyle interventions in people with fatty liver disease (MASLD) convincingly demonstrated that lifestyle interventions (diet, exercise, weight loss) effectively improved blood lipids, liver enzymes, liver fat content and insulin resistance in patients (Chen et al., 2025). The changes in diet and exercise led to weight loss and fat mass reduction, improving the health of adults with MASLD (Younossi et al., 2021). The extent to which metabolic health improved depended on the amount of weight loss relative to the initial weight. The higher the percentage of weight loss, the better the liver responded and the greater the improvement in liver steatosis. No single specific intervention stands out. However, it must be emphasised that for motivation and maintenance of behaviour in daily life, it is important that the intervention is well tailored to the individual and that there is a multidisciplinary treatment team that works well together (Chen et al., 2025).

Table 1. Overview of various accredited GLIs that are reimbursed under basic insurance.

GLI SLIMMER	GLI CooL	GLI BeweegKuur
The aim of GLI SLIMMER is to promote sustainable behavioural change towards a healthy lifestyle in order to reduce overweight and obesity and improve quality of life. It is a two-year programme with multidisciplinary individual and group counselling focusing on exercise, nutrition and behavioural change and maintenance. The starting point for this is the guidelines for good nutrition and exercise for adults (Health Council, 2015, 2017). Several clinical studies show that people using SLIMMER lose around 2.5 kg in weight, improve their insulin sensitivity and eating habits, have a higher level of physical activity and see an improvement in their quality of life even after 1.5 years (Duijzer et al., 2017). The intervention also proved to be cost-effective (Duijzer et al., 2019) and suitable for people with both low and high socioeconomic status (Bukman et al., 2017). There is now also a recognised digital version of SLIMMER (**SLIMMER Powered by Ancora**) for people who benefit more from a digital intervention, such as participants who face practical challenges in attending physical group classes. Here too, the results of a pilot study are positive: Participants lost approximately 5.6% of their body weight and their blood lipid levels (-10% for total cholesterol and -13% for LDL cholesterol) and blood pressure improved (-3.5% for systolic blood pressure and -7.5% for diastolic blood pressure) (Gannamani et al., 2024).	The aim of GLI CooL is to increase personal motivation, self-management and health skills in order to achieve a sustainable lifestyle change resulting in weight loss and improved physical fitness and quality of life. CooL is a two-year programme consisting of 16 group sessions and seven hours of individual contact time with a lifestyle coach. Participants take control of their own lives and, together with the coach and group, set personal goals and actions that are monitored and adjusted if necessary. The CooL intervention has proven to be effective in the long term (two years) and shows that people lose an average of more than 4 kg in weight and more than 4 cm in waist circumference. In addition, perceived health and nutritional behaviour improve (Philippens et al., 2024). There is now also a digital and accredited version of CooL for digitally skilled participants (**CooL-MiGuide**).	The aim of GLI CooL is to increase personal motivation, self-management and health skills in order to achieve a sustainable lifestyle change resulting in weight loss and improved physical fitness and quality of life. CooL is a two-year programme consisting of 16 group sessions and seven hours of individual contact time with a lifestyle coach. Participants take control of their own lives and, together with the coach and group, set personal goals and actions that are monitored and adjusted if necessary. The CooL intervention has proven to be effective in the long term (two years) and shows that people lose an average of more than 4 kg in weight and more than 4 cm in waist circumference. In addition, perceived health and nutritional behaviour improve (Philippens et al., 2024). There is now also a digital and accredited version of CooL for digitally skilled participants (**CooL-MiGuide**).

Continued from Table 1 →

Specialised GLI	Samen Sportief in Beweging (SSiB)	X-Fitt GLI
For people living with class II and III obesity (BMI > 35 kg/m2), it is important to make use of a specialised GLI (Federation of Medical Specialists, 2023; Schokker & van de Griend, 2020). Essential elements of this programme include reducing energy intake through an individualised diet to achieve weight reduction, lasting improvement in eating behaviour, increasing physical activity, and accompanying interventions to support behavioural change and maintenance. A specialised GLI must consist of at least one phase focused on weight loss and a maintenance phase of at least six months. It is important to note that this target group is vulnerable to physical and mental comorbidities. This can hinder participation and the effectiveness of certain components of standard GLI programmes, as can a lack of motivation. Not all health insurers currently have separate reimbursement pathways or recognition for specialised GLI programmes in addition to the standard GLI programme. It often depends on the provider or the programme. There are currently no recognised specialised GLIs available.	Samen Sportief in Beweging (Sporty in Movement Together, SSiB) aims to achieve lasting weight reduction with a focus on exercise and nutrition. Participants receive one year of guidance from a lifestyle coach and start with an eight-week basic course in which they are coached by an exercise professional and nutrition professional on how to exercise and eat healthily. Together with the lifestyle coach, participants set their personal goals in individual and group consultations. The lifestyle coach and exercise professional guide participants in the stepover to exercise providers in their neighbourhood.	X-Fittt GLI aims to achieve weight reduction and lasting behavioural change. The focus is on nutrition and exercise through guidance from a lifestyle coach. The two-year GLI programme consists of four phases: the intensive phase, the guidance phase, the maintenance phase and the aftercare phase. X-Fittt GLI is offered by exercise centres in addition to the general practice. Participants have access to an X-Fittt App for physical measurements, monitoring progress and keeping a food diary. There is a group and individual version of this intervention. Both versions are offered with a free (limited access) or paid (unlimited access) gym membership.

Conclusion

There are various accredited GLIs available that are reimbursed through basic insurance, particularly for people with class I obesity. Various GLIs show an improvement in lifestyle, a better quality of life and some weight reduction. The GLI monitor also indicates that the current GLI is mainly used by people with an average socio-economic position and not yet by people with a low socio-economic position (Oosterhoff et al., 2024). According to Pharos, the reason for this is that GLIs have not yet adapted their programmes to suit people with low literacy skills or take sufficient account of culture, for example for people with a migrant background (Pharos, n.d.). There are also no recognised specialised GLIs available that take sufficient account of the vulnerability of people living with class II and III obesity.

The GLI is also intended for people who are overweight in combination with risk factors and/or metabolic syndrome to prevent them from developing diseases such as type 2 diabetes. However, only 10% of this group currently uses the GLI, even though it can also provide them with health benefits and improve their quality of life. There are several reasons for this low uptake. For example, the GLI has a high dropout rate and vulnerable groups, such as people with low socio-economic status or limited health literacy, are often not reached effectively. Furthermore, the approach is insufficiently tailored to different living environ-

ments due to a lack of cultural sensitivity and flexibility. In addition, general practitioners do not always actively refer patients, and the range of available options is difficult to overview. Because there is little room for customisation, the potential of the GLI remains largely untapped (Zorgverzekeraars Nederland, 2024).

Cardiovascular disease

Clinical picture and underlying mechanisms

In 2023, an estimated 1.7 million people in the Netherlands suffered from cardiovascular disease. This encompasses a broad range of conditions, such as heart attacks, strokes and heart failure. The most common are coronary heart diseases. In 2023, approximately 39,000 people died from cardiovascular disease, accounting for 23% of total mortality, making it one of the leading causes of death in the Netherlands. Cardiovascular disease is more common in men than in women and especially amongst the elderly (VZinfo, n.d.-e).

The cardiovascular system functions as a complex network in which multiple organs work together. The heart muscle pumps blood around the body, the blood vessels transport oxygen and nutrients, and organs such as the kidneys and brain are sensitive to fluctuations in blood pressure and blood flow. Disruption of one component can therefore lead to system failure. Important driving forces behind vascular wall damage and endothelial dysfunction (damage to the inner lining of blood vessels) are high blood pressure (hypertension), elevated LDL cholesterol and insulin resistance (Hart in Shape, 2024). The body initially compensates by making the heart work harder or through hormonal regulation of blood pressure, such as the renin-angiotensin-aldosterone system (RAAS). However, with continued stress, this compensation becomes exhausted, leading to disease progression.
There are various subtypes of cardiovascular disease, such as inflammatory or metabolic forms of atherosclerosis, which differ in terms of underlying pathophysiology and risk of complications (Frąk et al., 2022). This offers opportunities for more personalised prevention and treatment, for example through lifestyle interventions or medication tailored to the dominant mechanism (Amruthasree, 2024).

The development of cardiovascular disease is largely influenced by lifestyle: it is estimated that 70-80% of cases can be attributed to risk factors such as smoking, unhealthy diet, physical inactivity, obesity and chronic stress. Hereditary predisposition and ageing also play a role. Cardiovascular disease is essentially a systemic disease centred on damage to the blood vessels, also known as atherosclerosis. Atherosclerosis is a process of gradual fat accumulation in the vessel wall, with chronic inflammation as the underlying mechanism. This plaque formation can lead to narrowing or blockage of the blood vessels, which can result in a heart attack or stroke.

Effect of lifestyle interventions on these mechanisms

For people with cardiovascular disease, there are several lifestyle programmes aimed at improving cardiovascular health and reducing risk factors such as high blood pressure, dyslipidaemia, obesity and chronic stress. Various components of lifestyle interventions are therefore important for cardiovascular disease. There is considerable scientific evidence for the benefits of exercise for cardiovascular disease (Mi et al., 2025), especially on cardiovascular function. Nutrition, vegetables, fruit and total energy intake are important for weight, blood cholesterol and the prevention of inflammatory factors (Netherlands Nutrition Centre, n.d.). Quitting smoking is also a key intervention for improving cardiovascular health and reducing risk factors. In combination with diet, exercise and stress reduction, it has an additive treatment effect on blood pressure, endothelial function and event reduction. Offering intensive smoking cessation support (including medication) as a standard treatment option is therefore recommended (Damen et al., 2024; Trimbos Institute, n.d.; Trimbos Institute & Dutch College of General Practitioners, 2016).

A well-known example of an effective lifestyle programme is **CooL** (see above), which has been reimbursed by basic insurance as a GLI since 2019. Although this programme is not exclusively aimed at people with cardiovascular disease, many people with an increased cardiovascular risk participate in it. The intervention consists of an eight-month treatment phase and a 16-month maintenance phase. CooL focuses on themes such as nutrition, exercise, sleep, stress and behavioural change. Participants with cardiovascular disease show an average weight loss of 3-4 kg, a reduction in systolic blood pressure of 5 mmHg on average, and an improvement in quality of life (Oosterhoff et al., 2023).

Another intervention is the **Cardiovascular Lifestyle Intervention** (Cardiovascular Risk Management-GLI; CVRM-GLI), developed in collaboration with general practitioners and lifestyle coaches specifically for people with increased cardiovascular risk or a history of cardiovascular disease. This intervention includes group sessions and individual coaching aimed at reducing risk factors such as LDL cholesterol, BMI and blood pressure. Initial research results show that LDL cholesterol decreases by an average of 0.4 mmol/L and that a significant proportion of participants can reduce or stabilise their medication use (Castela Forte et al., 2022; Federation of Medical Specialists, 2024).

Diet as co-treatment (e.g. Mediterranean-style or DASH diet) is used in a protocolised manner alongside cardiovascular risk management (CVRM) medication, with joint outcome monitoring (LDL-C, blood pressure, weight) and pharmacotherapy review to prevent over or undertreatment (Dutch College of General Practitioners, 2021, 2024; Sebastian et al., 2024).

There are also exercise programmes such as **'Hart in Beweging' (Heart in Motion)**, intended for patients who have suffered a heart attack or undergone angioplasty. This programme, often in collaboration with physiotherapists and rehabilitation centres, emphasises the gradual build-up of physical activity, behavioural change and strengthening faith in one's abilities (self-efficacy). Regular exercise – such as aerobic or strength training – improves cardiovascular fitness (aerobic capacity), blood pressure, mental health and quality of life, among other things (Federation of Medical Specialists, 2025).

A number of pilot projects have also experimented with **digital lifestyle coaching in combination with telemonitoring of blood pressure and weight** in people with hypertension and heart failure. This approach shows promising results in terms of treatment adherence, weight loss and reduction in blood pressure levels. Participants report feeling more engaged and motivated thanks to real-time feedback and remote coaching (Breeman et al., 2025).

The use of **continuous digital monitoring** (such as smartwatches for heart rhythm and blood pressure) is still in the pilot phase for cardiovascular disease. However, there are indications that these technologies, in combination with lifestyle interventions, can help with the early detection of cardiac arrhythmias and increase awareness of lifestyle behaviour (Stevenson et al., 2023).

Conclusion

Lifestyle interventions affect multiple systems, from improving endothelial function through exercise and reducing inflammation through weight loss to improving lipid profiles and blood pressure regulation. Studies provide strong evidence for lifestyle in the primary prevention of cardiovascular disease, but also support the evidence for lifestyle interventions in secondary prevention. In general, people with cardiovascular disease can undergo broadly the same lifestyle interventions as people with other chronic conditions or the general population. The structure of the exercise programme remains important, but there are no contraindications to exercise. According to the Health Council of the Netherlands

(Health Council of the Netherlands, 2024), the Guidelines for a Healthy Diet (Health Council of the Netherlands, 2015) apply to cardiovascular disease patients, just as they do to the general population.

3.3 Cancer

Clinical picture and underlying mechanisms

In 2024, approximately 130,000 new cases of cancer were diagnosed in the Netherlands. More than half of these (54%) were in people aged 70 or older. In the 30-59 age group, cancer is relatively more common in women because breast cancer and cancer of the female reproductive organs also occur at a younger age. From the age of 60 onwards, cancer becomes more common in men, mainly because prostate cancer and some smoking-related forms of cancer, such as lung cancer, are more common in men aged 60 and older. However, the prevalence of smoking-related forms of cancer in men and women is rapidly converging as the differences in smoking behaviour become less pronounced. The most commonly diagnosed form of cancer in 2024 was skin cancer, followed by breast cancer, lung cancer, prostate cancer and colon cancer. In 2023, more than 45,000 people died of cancer, accounting for almost 27% of total deaths in that year (VZinfo, 2025a).

Cancer develops as a result of cumulative DNA damage in the same clone of cells. Cells with such damage develop an abnormal transcriptome, causing an increasing number of pathogenic characteristics of cancer to develop, which can lead to tumour growth and metastasis. These characteristics, also known as 'hallmarks of cancer', include chronic proliferation (escape from growth suppression, programmed cell death and destruction by the immune system), the ability to replicate indefinitely and form new blood vessels, deregulation of cellular energy metabolism and increased sensitivity to inflammation (Hanahan & Weinberg, 2011). The DNA damage that starts it all is usually random errors during cell division (Tomasetti et al., 2017). Almost all of these errors are repaired very effectively by the cell's DNA repair mechanism, but sometimes they are not. Exogenous factors, including lifestyle factors such as smoking, can also cause DNA damage and thus initiate cancer. However, a poor lifestyle can also interfere with one of the hallmarks and thus stimulate cancer development. Approximately one-third of all new cancer diagnoses are attributed to lifestyle factors (Lanting et al., 2014; Tomasetti et al., 2017).

Effect of lifestyle interventions on these mechanisms

Lifestyle not only affects the risk of cancer but also the prognosis after treatment. On the one hand, this can be explained by the effect of lifestyle on the aforementioned hallmarks. On the other hand, patients with a healthy lifestyle, and therefore better physical condition, are better able to withstand the highly intensive treatments and are therefore more likely to receive 'complete' treatment. The current practice of prehabilitation is based on this latter effect of lifestyle in patients who have to undergo major surgery or systemic therapy (Heger et al., 2020; Michael et al., 2021). An example of a lifestyle treatment is smoking cessation around the time of diagnosis and during treatment. This is associated with less therapy toxicity, fewer complications and a better response, particularly in surgery and radiotherapy (Chellappan, 2022; Trimbos Institute, 2025). The prognosis for cancer is assessed in various ways, including treatment-related toxicity, quality of life, overall survival, cancer-specific survival and the risk of recurrence, progression and metastasis. Most of the evidence for the beneficial effect of a healthy lifestyle on these outcomes comes from observational studies rather than randomised trials. This is partly due to the follow-up period required for most of these outcomes. Because of the power required, most studies have been conducted on common tumour types with a relatively good prognosis, such as breast and colon cancer.

It is impossible to provide a complete picture of the effects of lifestyle (interventions) on the prognosis of all forms of cancer. To give an idea, however, a few examples are highlighted with a focus on recent meta-analyses.

The Global Cancer Update Programme (CUP) of the World Cancer Research Fund (WCRF) has set up international panels to assess and evaluate the available literature – only randomised trials and cohort studies – in the field of diet, nutrition, physical activity, obesity and cancer prognosis (World Cancer Research Fund International, n.d.). So far, this has led to reports on breast cancer (World Cancer Research Fund International, 2024a) and colorectal cancer (World Cancer Research Fund International, 2024b). For other types of cancer, the literature was not yet sufficiently clear.

The report on **breast cancer** is based on four systematic reviews incorporating 432 studies (Becerra-Tomás et al., 2023; Cariolou et al., 2023; Chan et al., 2023; Tsilidis et al., 2023). The most important findings are:

- More physical activity improves quality of life, but it is not yet clear how the frequency and amount of PA influence this quality. The most active women with breast cancer have a 42% lower risk of breast cancer mortality compared to women with low PA.
- There is strong evidence that a higher BMI, waist circumference and waist-to-hip ratio after diagnosis increase the risk of mortality. There is limited evidence that these characteristics increase the risk of recurrence.
- There is limited evidence that eating soy may reduce the risk of mortality and breast cancer recurrence and that eating more fibre reduces mortality.
- Higher vitamin D levels are associated with better outcomes after a breast cancer diagnosis, but there is no evidence that taking vitamin D supplements offers any benefit.
- There is still little evidence that behavioural changes after diagnosis improve prognosis.

The report on **colorectal cancer** is based on three systematic reviews containing 174 studies (Becerra-Tomás et al., 2024; Chan et al., 2024; Markozannes et al., 2024). The most important findings are:

- Patients with colorectal cancer who engage in more recreational exercise appear to have a lower risk of recurrence and mortality, but it is not yet clear whether increasing exercise after diagnosis affects the prognosis.
- Patients who eat more whole grains, drink more coffee (with and without caffeine) and drink fewer sugary drinks also have better outcomes, but here too it is not yet clear whether changing behaviour after diagnosis offers any benefit.
- For a number of other factors, such as BMI, there was insufficient evidence of a relationship with prognosis (Tsilidis et al., 2024).

Smoking has not been examined as a determinant of outcomes by a CUP panel. An earlier meta-analysis did examine this for breast cancer and found that smoking after treatment increases the risk of dying from breast cancer by a factor of two (Braithwaite et al., 2012). A later meta-analysis suggests that this effect is also dose-dependent. A review of the effect of smoking on colon cancer prognosis also shows that smokers have a higher risk of dying from colon cancer. Whether quitting smoking reduces that risk is less clear (van Zutphen et al., 2017).

In a comprehensive meta-analysis of post-diagnostic physical activity on cancer-specific mortality among six groups of patients, hazard ratios between 0.6 and 0.8 were found for the highest versus lowest category of physical activity (Friedenreich et al., 2020). For most adjuvant chemotherapy agents used in practice, the same or weaker hazard ratios were found in randomised trials at the time.

For the prognosis of **prostate cancer**, favourable effects of a healthier lifestyle have also been reported (Brookman-May et al., 2019), particularly more physical activity and not smoking. The same applies to many other types of tumours, but the results are not always consistent and the evidence is therefore not yet truly convincing.

Finally, preclinical and observational studies have suggested that exercise improves cancer outcomes, but convincing evidence was lacking. A phase 3 study in patients with **colorectal cancer** (after surgery and chemotherapy) compared a three-year structured exercise programme with information material alone (Courneya et al., 2025). After an average follow-up of 7.9 years, disease-free survival was significantly better in the exercise group. Overall survival after eight years was also higher. Exercise immediately after chemotherapy therefore appears to increase survival rates.

Conclusion

Although most of it comes from observational studies, these is convincing evidence that a healthier lifestyle (especially more physical activity) improves quality of life, life expectancy and the risk of comorbidity in cancer patients. There is not yet much hard evidence that this also applies to cancer-specific outcomes such as recurrence, metastasis and cancer-specific survival. This is simply because not many randomised trials have been reported yet. However, the recent phase 3 study on colorectal cancer suggests that these outcomes are also related to lifestyle.

3.4 Musculoskeletal disorders

The risk of developing musculoskeletal disorders (MSDs) is related to age, type of work, level of activity, lifestyle and family history. Work-related stress – posture during work, repetitive movements, lifting heavy weights, sitting for long periods (without breaks) – plays a particularly important role in certain MSDs. Sports injuries can also result in MSDs. Sick leave due to MSDs accounts for a fifth of all sick leave. This varies greatly between men and women: 25.8% for men and 15.2% for women (VZinfo, 2025d).

Clinical picture and underlying mechanisms

Common musculoskeletal disorders that are mainly related to age, lifestyle and living environment include osteoporosis, osteoarthritis, rheumatoid arthritis, sarcopenia and fibromyalgia. These are different types of disorders affecting the skeletal and muscular systems. Osteoporosis affects the bones, osteoarthritis and rheumatoid arthritis are joint disorders, and sarcopenia and fibromyalgia affect the muscles and connective tissue respectively. Different underlying biological mechanisms therefore play a role in the various musculoskeletal disorders.

Osteoporosis

Worldwide, the prevalence of osteoporosis, or low bone mineral density, is approximately 22% among people aged 50-85 (Salari et al., 2021). In the Netherlands, approximately one million people have osteoporosis. Osteoporosis is often only discovered after a bone fracture. Bone tissue is active, living tissue and is stimulated to grow throughout life, mainly by mechanical loading. From birth, bone mass grows through the intake of sufficient calcium and vitamin D in combination with sufficient exercise. Maximum bone mass is reached around the age of 30. After this, bone mass decreases; in women, this can happen more quickly due to the menopause and the influence of hormones. However, men also suffer from osteo-

porosis. Of the people who have osteoporosis, approximately two thirds are women and one third are men. Every year, more than 105,000 people over the age of 55 suffer a bone fracture as a result of osteoporosis.

Arthritis

Arthritis, an inflammation of the joints, is a collective term for various conditions. The two main forms, osteoarthritis and rheumatoid arthritis, cause the same joint pain and limited mobility. However, the causes of these conditions are clearly different. Correct diagnosis is essential for effective treatment.

Osteoarthritis

Osteoarthritis (also known as degenerative joint disease) is a condition that affects the entire joint (ReumaNederland, n.d.-a). It causes the quality of the cartilage to deteriorate, becoming thinner, softer and more brittle. This can lead to bone deformation directly beneath the cartilage. Visible and palpable lumps form at the edge of the joint (VZinfo, n.d.-b). This restricts the joint's range of motion (stiffness and difficulty moving) and causes pain. Patients may suffer in one joint, but multiple joints may also be affected. Osteoarthritis occurs mainly in the knees, hips, neck, lower back, thumb, fingers and big toe. The disease is irreversible; slowing down the process is therefore important to limit the burden of disease. Osteoarthritis is the most common rheumatic disorder of the musculoskeletal system: almost 1.6 million people in the Netherlands have osteoarthritis. It is the fastest growing rheumatic disorder in the Netherlands. Osteoarthritis also affects two thirds of women and one third of men (VZinfo, n.d.-a). The causes of osteoarthritis are often not lifestyle-related. Age, accidents, prolonged strain, obesity, heredity and comorbidity with other diseases are risk factors for osteoarthritis (National Association ReumaZorg Nederland, 2025). However, a lack of exercise can increase the risk of developing and progressing osteoarthritis (He, Zhang, et al., 2025) because insufficient muscle strength and reduced joint stability increase the strain on the joints. In addition, osteoarthritis itself has an effect on lifestyle because disorders of the musculoskeletal system influence the degree of movement.

Rheumatoid arthritis

Rheumatoid arthritis (RA) is a chronic autoimmune disease (ReumaNederland, n.d.-b). Symptoms vary: periods of (severe) joint inflammation alternate with periods of little or no joint inflammation. The disease can start gradually or suddenly and occurs at all ages. RA is more common in women than in men. It is not clear why the body turns against itself and develops RA. Approximately 260,000 people in the Netherlands have RA.

Sarcopenia

Sarcopenia is a condition in which muscle tissue breaks down faster than new muscle tissue is produced (Cruz-Jentoft & Sayer, 2019). Muscle strength and muscle mass decline from the age of 25. From the age of 65, the risk of sarcopenia increases significantly (Alles Over Sarcopenie, n.d.). The decline in muscle mass leads to a functional decline in muscle strength, which means that older people are less resilient. Sarcopenia affects independence because it impacts daily functioning and therefore the quality of life of older people. Muscle weakness also increases the risk of falls and fractures. It is not only is ageing that is related to muscle loss; a negative energy balance (conscious or unconscious) often leads to a loss of muscle mass in addition to a loss of fat mass (Stefanakis et al., 2024). In addition, too little physical activity (inactivity or bedriddenness), too little protein intake, vitamin D deficiency, malnutrition, diseases (e.g. cancer) and/or medication (e.g. the new GLP1 medication for obesity and diabetes) are associated with muscle mass loss (Cruz-Jentoft & Sayer, 2019; Neeland et al., 2024). Hormonal imbalance and increased oxidative stress are thought to be underlying disruptive mechanisms. Chronic inflammation may also play a role in sarcopenia as chronic, low-grade inflammation suppresses muscle synthesis (growth) and promotes muscle

atrophy (D. Kim et al., 2025). The prevalence of sarcopenia is highly variable, ranging from 1-29% among people living at home, 14-33% in elderly care institutions and approximately 10% in hospitals. The wide range in prevalence figures is due to the fact that different methods and cut-off points have been used in studies to assess muscle mass, muscle strength and physical performance (Voeding & Beweging NU, n.d.). It is important to limit the (natural) loss of muscle mass due to ageing as much as possible by continuing to stimulate muscle production and preventing excessive loss.

Fibromyalgia

Fibromyalgia is a syndrome characterised by long-term (chronic) pain in muscles and connective tissue. This pain is often accompanied by stiffness, fatigue, intestinal problems, sleep disorders and mood swings. The symptoms can vary from day to day. Fibromyalgia does not cause any abnormalities in the muscles, connective tissue or elsewhere in the body. The cause of fibromyalgia is still unknown. Increased muscle tension, brain control, overstimulation or disturbed pain stimulation may play a role. There are no medications to cure the condition. However, the symptoms can be reduced with painkillers and by alternating between exercise and rest. It is estimated that 2-8% of the world's population has fibromyalgia (Siracusa et al., 2021).

Effect of lifestyle interventions on these mechanisms

The affected tissue differs in the aforementioned conditions (bone, muscle, weight, tendon). As a result, lifestyle interventions may have varying degrees of effectiveness.

Important risk factors for **osteoporosis** include an unhealthy lifestyle, such as smoking, excessive alcohol consumption, lack of exercise, a diet low in calcium, protein and vitamins, and a low BMI (Morin et al., 2025). It is therefore very important, especially from the age of 35 onwards, to continue exercising in order to stimulate bone formation and to consume the right nutrients (dairy products, vegetables, nuts and legumes).

In physical activity, it is important that body weight places a load on the skeleton (e.g. walking or climbing stairs). Strength training not only strengthens the muscles, but also the tendons and bones and is an effective treatment for osteoporosis. In addition, balance training is very important for gaining more control over posture and movement, thereby preventing falls (Hoong et al., 2025; Morin et al., 2025). Fall prevention programmes, such as Otago, In Balans, Vallen Verleden Tijd, in which balance and muscle control play a role in preventing falls and fractures are a good intervention for patients at increased risk.

There has been much debate about vitamin D in recent years, particularly regarding the optimal dosage and the benefits of supplementation for different target groups. Although it is widely recognised that vitamin D is essential for calcium absorption and bone health, studies show that high doses (such as 4000-10,000 IU per day) in healthy adults offer no additional benefit for bone density and may even be harmful (Burt et al., 2019; Marcinowska-Suchowierska et al., 2018). Current guidelines therefore recommend daily vitamin D supplementation for women aged ≥50, men aged ≥70, people at increased risk of fracture, people with dark skin and people with limited exposure to sunlight (Federation of Medical Specialists, 2022; Netherlands Health Council, 2018). Supplementation is most effective in combination with adequate calcium intake through diet. High bolus doses are not recommended due to an increased risk of falls. Alcohol consumption plays an important dual role. Excessive alcohol consumption not only negatively affects bone growth; it also leads to a higher risk of falls. Avoiding alcohol as a fall prevention strategy is certainly important for people with osteoporosis in order to prevent fractures.

Osteoarthritis is a degenerative disease and can therefore only be treated to alleviate symptoms. In addition to medication, non-pharmacological interventions have also been investigated to reduce patients' pain and mobility problems and improve their quality of life. Research into the effects of various interventions – supervised by healthcare professionals and focused on patient education, emotional support and pain management – led to better treatment compliance, increased mobility, a reduction in depressive symptoms and improved sleep (Verga Răuță et al., 2025). A reduction in pain symptoms, improved mobility and a better quality of life enable patients to exercise more. The type of exercise is often 'joint-friendly', limiting the strain on the joints and making it possible to exercise without pain. When exercising in water, such as swimming, aqua gym or aqua aerobics, the patient's body weight has less influence on movement. This allows them to work on their overall fitness and maintain muscle strength (H. S. Kim et al., 2016). In addition to exercise, nutrition also plays an important role. Recent research shows that a multidisciplinary lifestyle programme called Plants for Joints, which combines a plant-based diet with exercise, stress management and sleep hygiene, leads to a reduction in pain and stiffness, improved physical functioning and beneficial effects on weight, blood sugar and cholesterol in patients with osteoarthritis (Walrabenstein, Wagenaar, van de Put, et al., 2023). Finally, it appears that restricted food intake, leading to weight loss, improves the physical functioning of patients with knee osteoarthritis in combination with physiotherapy (VZinfo, n.d.-c).

For patients with **rheumatoid arthritis**, lifestyle programmes incorporating various physiotherapy elements and, in particular, structured exercise programmes have been shown to reduce pain and improve quality of life. Integrating multimodal physiotherapy with nutrition and complementary therapies can improve patient outcomes (Sundus et al., 2025). Plants for Joints, the aforementioned lifestyle programme that focuses on plant-based nutrition, exercise, sleep hygiene and stress management, has an anti-inflammatory effect that is particularly valuable in conditions such as RA, where inflammation plays a key role. After 16 weeks, participants experienced a reduction in pain symptoms, decreased joint stiffness and improved physical functioning compared to people with RA who received standard care (Walrabenstein, Wagenaar, van der Leeden, et al., 2023). The research forms the basis for the Duurzaam Vitaal (Sustainable Vitality) lifestyle intervention, which is currently undergoing the accreditation process at the RIVM. The programme is currently only reimbursed by ONVZ under supplementary insurance.

As muscle mass growth can be stimulated through exercise, training – particularly resistance/strength training – is beneficial in cases of **sarcopenia**. Various studies have shown that participants experienced an increase in muscle mass as a result of exercise. The training is more effective when the intervention is combined with the right nutrition (protein, vitamin D). A combined intervention led to improvements in, for example, muscle mass, strength and walking speed in older participants with sarcopenia (H. Kim et al., 2025). Resistance training is used as a preventive therapy for sarcopenia and as a treatment therapy to improve muscle strength and performance. The combination with aerobic training (endurance training) is particularly important in order to maintain resistance training. Aerobic training itself is less important for muscle mass maintenance. Resistance training can easily be done at home with elastic resistance bands. However, research has found that it has less effect on muscle mass, possibly due to the lower intensity of training at home without supervision (D. Kim et al., 2025). Specific attention to nutrition, such as leucine supplementation to prevent muscle mass loss, does not appear to be effective. In combination with vitamin D, leucine intake may be beneficial for muscle maintenance (D. Kim et al., 2025; Memelink et al., 2020). The combination of supplementation and exercise is more effective than nutritional supplementation alone. Finally, treating chronic inflammation is seen as an important approach to preventing sarcopenia (D. Kim et al., 2025).

Various interventions are mentioned for patients with **fibromyalgia**; only exercise can be considered a lifestyle intervention. Other interventions that have been studied include medication, heat therapy and alternative therapies (Maffei, 2020). Aerobic training was identified as the 'gold standard' for people with fibromyalgia in a Cochrane review (2007) (Busch et al., 2007). Aerobic exercise (dancing, cycling, yoga) slightly relieves pain and improves fitness in patients with fibromyalgia, but no clear difference in the type of exercise has been reported in terms of effectiveness (Maffei, 2020). It also appears that pain does not decrease in the long term (Rodríguez-Domínguez et al., 2025). Resistance training with increasing intensity has been studied and it is recommended to start with a load of 40% of the maximum load. Research has shown promising results of progressive intensity on pain reduction, increased muscle function and, as a result, an improvement in quality of life (Guachizaca Moreno et al., 2025). A meta-analysis shows that, in the short term, activities in water are particularly effective for pain reduction in women with fibromyalgia. Resistance training proved to be most effective in the long term (Rodríguez-Domínguez et al., 2025).

Conclusion

Leefstijlinterventies kunnen een waardevolle rol spelen bij het voorkomen en Lifestyle interventions can play a valuable role in preventing and treating musculoskeletal disorders and improving overall fitness, although the degree of effectiveness varies depending on the condition. The evidence for lifestyle interventions is strongest for osteoporosis and sarcopenia: regular physical activity, particularly strength training and balance training, combined with adequate intake of calcium, protein and vitamin D, contributes to the maintenance of bone and muscle mass and reduces the risk of falls and fractures. For osteoarthritis and RA, lifestyle interventions are mainly aimed at improving quality of life and reducing pain and stiffness. Exercise, weight loss and a plant-based diet have been shown to be effective, especially within multidisciplinary programmes such as Plants for Joints. For fibromyalgia, the evidence is less clear, but aerobic and resistance training have been shown to have positive effects on pain and functioning.

Although lifestyle is not always a direct cause of these conditions, it can contribute to limiting symptoms and improving daily functioning. Prevention and treatment through lifestyle interventions therefore offer prospects, provided they are tailored to the specific clinical picture and the individual capacity of the patient. Further implementation and reimbursement of recognised programmes can contribute to sustainable health gains. Fall prevention programmes can be used to alleviate fear of falling and improve stability in older people.

3.5 Dementia

Clinical picture and underlying mechanisms

Age is the main factor in the development of dementia. An increase in dementia is therefore to be expected due to the ageing population. Based on population research, it is estimated that there were 290,000 people with dementia in the Netherlands in 2021. Of these, approximately 15,000 people have a form of dementia at a young age. In these cases, there is often a genetic cause, but lifestyle and lifestyle-related conditions also play a role in increasing the risk (Alzheimer Nederland, n.d.).

Dementia is not a single disease but a syndrome caused by more than 50 different brain disorders, with neurocognitive disorders being the main characteristic. These disorders increase over time, eventually preventing people from functioning independently. The most common forms of dementia are Alzheimer's disease (65%), vascular dementia (22%), frontotemporal dementia (4%) and Lewy body dementia (2%) (Francke et al., 2018).

Figure 3. Disease burden of chronic and long-term conditions 2022-2050 in DALYs (disability-adjusted life years).

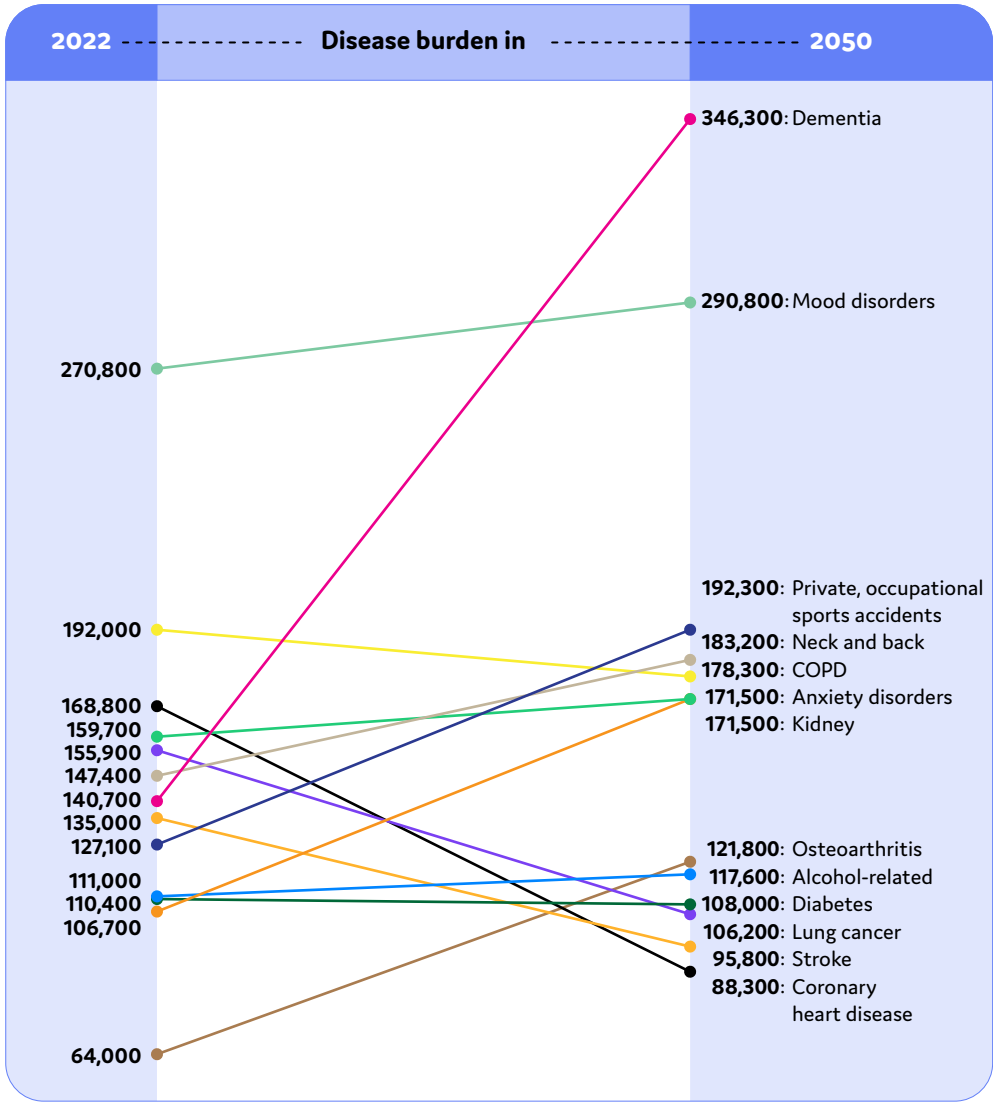


Figure adapted from National Institute for Public Health and the Environment et al. (2024)

Neurodegenerative disorders such as Alzheimer's disease, vascular dementia and Parkinson's disease are progressive conditions that cause a significant and rapidly growing disease burden in an ageing population. The disease burden, expressed in disability-adjusted life years (DALY), is a measure of public health that combines both the prevalence and severity of disorders with mortality resulting from these disorders. Dementia is expected to cause the greatest disease burden in the Netherlands by 2050, with an increase of 150% compared to 2022 (Figure 3). In 2023, 17,339 people died with dementia as the underlying cause of death (VZinfo, 2024a).

When exploring causal links that lead to dementia, reducing high blood pressure appears to be one of the most promising strategies for prevention (Hughes et al., 2020; Peters et al., 2022; Schroevers et al., 2024; Xie et al., 2025). In addition, an energy deficit in the brain due to reduced blood flow, inflammation and decreased activity may play a role in dementia. Certainly as long as there is no effective medication available for dementia, it is important to encourage people with early-stage dementia symptoms to adopt a healthier lifestyle. Encouragement of the lifestyle factors of exercise, social interaction and relaxation in the form of new activities improves blood flow to the brain and increases brain activation, thereby limiting/slowing down the decline in cognitive functioning through a healthier lifestyle (Livingston et al., 2024; Rosenau et al., 2024; World Health Organisation, 2019). The direct causal contribution of lifestyle factors such as healthy nutrition, sufficient exercise and stress reduction is not yet entirely clear, and studies on interventions targeting individual risk factors are inconsistent (World Health Organisation, 2019). However, based on population studies and preclinical studies, there is consensus that an unhealthy lifestyle and lifestyle-related conditions play a role in the development of dementia due to vascular brain damage (vascular insufficiency, reduced blood flow, white plaques, and (small, silent) cerebral infarcts), oxidative stress, toxic effects of hyperglycaemia and insulin resistance, neuroinflammation,

and reduced cognitive reserve and neural connectivity (Livingston et al., 2024; Rosenau et al., 2024).

The role of lifestyle factors as risk factors is reasonably well established, particularly in relation to dementia. The Lancet Commission on Dementia Prevention, Intervention and Care (Livingston et al., 2024) states that approximately 45% of all dementia cases worldwide can potentially be attributed to modifiable factors such as hypertension, diabetes, obesity in middle age, smoking, physical inactivity and depression. For vascular dementia, cardiovascular risk factors such as high blood pressure and obesity are even more strongly associated with increased incidence than in Alzheimer's disease (Jones et al., 2024; M. Zhang et al., 2023). For Parkinson's disease, it is also becoming increasingly clear that lifestyle factors such as physical inactivity and obesity may play a role, although the evidence here is less robust (Padilha et al., 2023).

Effect of lifestyle interventions on these mechanisms

In recent years, it has become clear that lifestyle factors not only play a role in the primary prevention of neurodegenerative disorders but also offer opportunities for secondary and tertiary prevention, aimed at slowing progression, improving functioning and increasing quality of life.

Hypertension stands out among the modifiable factors. Several meta-analyses (Hughes et al., 2020; Lennon et al., 2024) and a recent RCT (He, Zhao, et al., 2025) show that **lowering blood pressure** – both through medication and lifestyle changes – slows cognitive decline and significantly reduces the risk of dementia. This makes hypertension the only risk factor for which a causal link with dementia has also been largely demonstrated. In addition to medication, salt restriction, weight reduction, increased physical activity and stress reduction are effective in lowering blood pressure. Targeted blood pressure reduction also contributes to reducing the risk of other chronic conditions, such as cardiovascular disease, stroke and kidney disease, making it a central core strategy in preventive healthcare. Furthermore, this approach offers opportunities to reduce the burden of care and improve quality of life for older people by promoting healthy ageing and limiting multimorbidity (Livingston et al., 2024). Sleep and relaxation may also contribute to reducing cognitive risks, but the available data is still conflicting and does not provide clear recommendations for interventions in this area (L. Mentink, 2024; L. J. Mentink et al., 2024).

Recent meta-analyses (Liu et al., 2024) show that **physical activity** can significantly improve cognitive functioning in people with mild cognitive impairment (MCI), with an additional positive effect on quality of life. It has recently become clear that preventing repeated head trauma in contact sports (from football to boxing) is important for reducing the risk of (early) dementia (Health Council of the Netherlands, 2025).

Systematic reviews point to beneficial effects of interventions that focus on **nutrition**, particularly Mediterranean, MIND and ketogenic diets, in people with MCI (Devranis et al., 2023). However, there are gaps in knowledge about the optimal dosage and long-term effects of these diets.

Multidomain interventions (such as FINGER, MAPT and US POINTER) show small but significant effects on cognitive functions (Andrieu et al., 2017; Baker et al., 2025; Moll van Charante et al., 2016; Ngandu et al., 2015; Zülke et al., 2024). FINGER-NL is currently investigating the effectiveness of cross-domain interventions in the Dutch context (Deckers et al., 2024). Such studies are largely lacking for Parkinson's disease. Nevertheless, studies show that physical training (dance, strength training) supports motor and cognitive functions (R. Kim et al., 2023). The effect of ketogenic diets and cognitive training on cognition is being investigated, but there are clear gaps in knowledge regarding robust long-term effects and translation into daily functioning.

Conclusion

There are strong indications that lifestyle interventions contribute to maintaining cognitive functioning and slowing cognitive decline in neurodegenerative disorders, particularly in cases of mild symptoms. They also contribute to overall resilience and improved health in people with early-stage dementia symptoms. Combating hypertension deserves special priority. Although not all interventions are equally well supported by scientific evidence, the health potential is considerable. Research into effective mechanisms and implementation deserves further priority, especially in certain populations.

3.6 Mental disorders

Clinical picture and underlying mechanisms

Mental health issues and psychiatric disorders are widespread and involve a complex interplay of biological, psychological and social factors. In 2023, more than 43% of Dutch adults experienced feelings of anxiety or depression. Young women, in particular, often report these symptoms while older people generally experience them relatively infrequently (VZinfo, 2025b). It is important to distinguish between psychological symptoms (such as gloominess, anxiety or sleep problems) and diagnosed psychiatric disorders. Long-term and severe symptoms that limit daily functioning are often the starting point for a formal psychiatric diagnosis, such as depression, anxiety disorders, bipolar disorders or post-traumatic stress disorder (PTSD). Schizophrenia and other psychotic disorders are also frequently diagnosed, with a substantial impact on life expectancy and quality of life.

In 2023, nearly 555,000 people with mood disorders were known to their general practitioner, the majority of whom had a depressive disorder. Anxiety disorders affected more than 15% of adults, most commonly those aged 25-29. PTSD is estimated to affect 7% of the Dutch population and is mainly diagnosed in young adults. Schizophrenia is less common, but in many cases leads to severe and long-term functional impairment, especially in men between the ages of 40 and 59 (VZinfo, 2024e). One mental disorder that has not yet been mentioned is addiction (drug, gambling, gaming or alcohol addiction), which is characterised by a pattern of problematic substance use or behaviour. In 2023, 2.3% of adults in the Netherlands had a drug disorder and 5.4% had an alcohol disorder. In both cases, the prevalence is higher among men than among women (VZinfo, n.d.-d, 2023).

The mechanisms underlying the aforementioned psychological symptoms and psychiatric disorders are complex and multi-causal. Hereditary factors, neurobiological vulnerability, environmental factors (such as stress, trauma or limited social support) and psychological comorbidity often play a role. Substance use is regularly employed as a coping strategy for psychological symptoms (known as the self-medication hypothesis), but in the long term contributes to the development or worsening of psychiatric disorders such as depression, anxiety and psychosis. Underlying these disorders are various mechanisms that reinforce lifestyle challenges. Sleep problems, physical inactivity, unhealthy eating patterns and substance use are much more common in people with mental health problems (Firth et al., 2020). In addition, the risk of cardiometabolic disorders, such as cardiovascular disease and diabetes, is significantly higher (1.5 to 2 times) in this group (Firth et al., 2019). A large Danish cohort study showed that people with a psychiatric disorder live on average 8.3 years shorter, with peaks of up to 15 years in more severe cases (Correll et al., 2015). A more recent Dutch cohort study confirms these findings (Konings et al., 2023).

The underlying causes of mental health problems are multifaceted and interrelated: genetic vulnerability, medication side effects (weight gain, movement disorders, appetite changes) and metabolic dysregulation, but also stress, social isolation, stigma and limited access to appropriate care (Correll et al., 2015, 2018; Firth et al., 2019; Plana-Ripoll et al., 2020; Teasdale et al., 2025).

In addition, symptoms of the condition itself, such as lack of initiative or low mood, hinder the ability to change lifestyle, while systemic factors such as financial constraints, fragmented care and unhealthy care environments further reinforce this. All these factors also influence each other: for example, less exercise can lead to poorer sleep, which in turn undermines the motivation to live more healthily (Pilcher et al., 2015).

The relationship between lifestyle and mental health is now well established. Diet, exercise, sleep and substance use not only contribute to the development of psychiatric disorders, but often influence their course (Firth et al., 2020). For example, physical inactivity, poor nutrition and sleep deprivation increase the risk of depression and anxiety, while people with psychotic disorders and bipolar disorder are more likely to exhibit unhealthy lifestyle patterns (Firth et al., 2020; Maurus et al., 2024; Oenema, 2019; Schuch et al., 2018, 2019). In addition, symptoms of different disorders often occur simultaneously (comorbidity), such as anxiety and stress symptoms in psychosis or depression. The complexity of these intertwined symptoms means that lifestyle interventions must be applied broadly, beyond the boundaries of individual diagnoses.

Effect of lifestyle interventions on these mechanisms

There is growing empirical evidence that lifestyle interventions have positive effects on both physical and mental health in people with psychiatric disorders. Most of the research focuses on combined interventions in which exercise, nutrition and sleep are central, but mind-body activities and stopping substance use are also receiving increasing attention (Ashdown-Franks et al., 2020; Firth et al., 2020; Marx et al., 2023; Maurus et al., 2024; Vancampfort et al., 2021, 2025; J. Zhang et al., 2020). Many lifestyle interventions have been developed with a view to improving physical health, such as weight loss or reducing cardiovascular risks. However, these effects are often less pronounced in people with mental disorders, partly due to genetic and biological vulnerability and side effects of medication (Speyer et al., 2019; Vancampfort et al., 2019). Nevertheless, it remains relevant to pay attention to nutrition, exercise and sleep, not only for physical wellbeing but also because of the impact on mental health symptoms and overall functioning. Mental health outcomes are another area where results can be achieved (and possibly more quickly).

Below, we provide a summary for each type of intervention based on the strongest scientific evidence, such as meta-reviews, systematic reviews and meta-analyses. This does not mean that there is no evidence for other conditions or associations. A more comprehensive overview can be found elsewhere (Cahn et al., 2022).

Nutrition and supplements

Nutrition plays an important role in mental health, although research in this area is still limited. Most studies focus on depression and show that a **healthy diet** (sufficient fruit, vegetables, fibre, fish and limited meat and saturated fat) reduces the risk of depression (Firth et al., 2020; Maurus et al., 2024; Oenema, 2019). There is no convincing evidence for specific diets. The aforementioned characteristics of healthy diets are reflected in both the Mediterranean diet and the Dutch Dietary Guidelines (Health Council of the Netherlands, 2015), which will be updated in 2026. These also form the basis for the recommendations of the Netherlands Nutrition Centre (Wheel of Five). For nutritional interventions, it is therefore particularly important to focus on promoting healthy eating patterns and good quality nutrition in line with these national and international guidelines (Marx et al., 2023; Mocking & Oenema, 2022). When it comes to supplementation, **omega-3 fatty acid supplementation** can be recommended in the treatment of adults with primary depression to reduce depressive symptoms, preferably as a supplement rather than monotherapy (Mocking & Oenema, 2022). However, there is no demonstrable effect of dietary supplements (omega-3 fatty acids, selenium,

folic acid, vitamin D + calcium) on the development of depression and anxiety symptoms.

Sleep

Sleep problems are often still seen and accepted as a consequence or symptom of (the treatment of) mental illness, even though they have a major impact on both physical and mental health (Lancel M. & van Veen, 2022). Poor sleep increases the risk of mental health problems and relapse (Firth et al., 2020). Sleep problems undermine behavioural change through negative effects on cognition, motivation and self-control. Insomnia increases the risk of comorbid symptoms, substance abuse and suicidality (Hertenstein et al., 2019; Malik et al., 2014). The first-choice treatment option for sleep problems is **cognitive behavioural therapy for insomnia** (CBT-I), which can reduce psychiatric symptoms and the aforementioned risks and improve quality of life. Although this applies to multiple diagnostic classifications, the strongest evidence currently exists for depression (Firth et al., 2020; Lancel M. & van Veen, 2022; Maurus et al., 2024). The treatment is as effective as pharmacological treatment in the short term but has a better long-term effect and minimal side effects. A Dutch-language protocol is available (Verbeek & van de Laar, 2023), as are adapted versions for bipolar disorder and psychosis, among others (Harvey et al., 2015; Waite et al., 2016). **Psychoeducation** about sleep and hygiene can also be used separately in conversations with clients, with a focus on day and evening rhythms, relaxation, environment and substance use (Lancel et al., 2020; Lancel M. & van Veen, 2022).

Cutting out substances

Substance use is a common problem within mental health care, with smoking, alcohol and cannabis being the most frequently mentioned substances. People with mental health problems smoke more often and more heavily, are more often nicotine-dependent and are less inclined to quit (de Leon & Diaz, 2005; Richardson et al., 2019). **Quitting smoking and other substances** has a direct positive impact on symptomatology, cognitive functioning and quality of life (de Leon & Diaz, 2005; Firth et al., 2020; Richardson et al., 2019; van den Brink & Schellekens, 2022). Although substance use is sometimes seen as a form of self-medication, studies show that quitting ultimately leads to a reduction in symptoms without a significant increase in aggression or incidents, provided that appropriate support is offered. This does not alter the fact that stress and anxiety may initially arise as part of withdrawal (van den Brink & Schellekens, 2022).

Physical activity and sedentary behaviour

By far the most research has been conducted on physical activity (Deenik, 2022; Firth et al., 2020). Within this domain, it is important to distinguish between physical activity and sedentary behaviour because sedentary behaviour is an independent risk factor for health problems. That is why guidelines recommend not only 150 minutes of moderate to intensive activity per week, but also regular breaks from prolonged sitting. Sufficient exercise reduces the risk of depression (10-21%) and anxiety disorders (18.5-48%), even in cases of psychotic and bipolar symptoms. This protective effect already occurs with 60 minutes of moderate activity per week, not even half of the exercise guidelines (Schuch et al., 2018, 2019). **Exercise interventions** are effective for mild to moderate depression and also improve quality of life (Marx et al., 2023; Maurus et al., 2024; Schuch, Vancampfort, Richards, et al., 2016; Schuch, Vancampfort, Rosenbaum, et al., 2016; Vancampfort et al., 2025). In anxiety disorders such as panic disorder, PTSD and social phobia, there is strong evidence for a curative effect (Ashdown-Franks et al., 2020). In psychosis, both symptoms and cognitive functioning improve with ≥90 minutes of activity per week (Ashdown-Franks et al., 2020; Maurus et al., 2024; Vancampfort et al., 2025). Positive effects on symptoms and executive functioning are also visible in attention deficit hyperactivity disorder (ADHD).

Although aerobic activity has been studied most extensively, recent research shows that muscle strength training (such as resistance bands and jumping exercises) offers similar benefits (Deenik, 2022). This is in line with the guideline to do bone and muscle strengthening exercises at least twice a week and offers potential for people who are less fond of 'active' physical activities (aerobic activities such as running or team sports) or for whom muscle strength training (anaerobic activity) is more feasible due to limitations such as physical limitations or reduced mobility.

Mind-body interventions

Meditation-based interventions, such as mindfulness, yoga and tai chi, show promising results in depression, psychosis, ADHD and PTSD. For example, an initial comprehensive meta-review of these interventions demonstrated the potential of mind-body interventions as a supplement to pharmacotherapy, psychotherapy and multidisciplinary lifestyle interventions. It remains difficult to make definitive statements about mind-body interventions due to heterogeneity in effects and uneven distribution of studies for different conditions, the limited sample size in the majority of studies, little direct comparison between mind-body interventions and other first-choice treatments, and indications of publication bias in most meta-analyses (Vancampfort et al., 2021).

Effect of lifestyle interventions on medication use

Something that has only been researched to a limited extent but shows promising results is the effect of lifestyle interventions on changes in medication use. Initial studies indicate that the use of psychotropic medication may decrease after lifestyle interventions, without medication reduction being a specific goal of these interventions (Deenik et al., 2018; Højlund et al., 2017). The studies suggest that lifestyle improvements have an effect on medication use, regardless of the degree of medication monitoring and changes in symptomatology. However, a possible independent effect of lifestyle improvements on medication use and associated mechanisms of action needs to be investigated further in order to make stronger statements. If this effect is confirmed, it will be an important finding.

GLIs for mental health conditions

Combined lifestyle interventions (gecombineerde leefstijlinterventies, GLIs) are currently only accessible to people with somatic health risks, although the structure and content of the interventions may also be relevant for improving mental health, quality of life and functioning. However, even in the presence of somatic risks, participation is often not feasible for people with mental health issues due to the relatively high demands on self-management, consistency and group participation. This is despite the fact that the structure of the GLI is well suited to what works for mental health conditions: long-term guidance, behavioural support, group dynamics and retention strategies. Co-creation with the people for whom the intervention is being developed (and their loved ones) is an important key to achieving interventions that deal as effectively as possible with personal barriers, mental health symptoms and structural challenges such as stigma, social inequality, financial constraints or limited access to appropriate care (Teasdale et al., 2025).

Although there is currently no recognised GLI programme aimed at people with mental health issues who have limited self-control or increased social vulnerability, evaluations and explorations are taking place (Dutch Healthcare Authority, 2025). In the meantime, the current GLI programmes can provide good support for people with milder mental health issues.

Conclusion

There is convincing evidence that lifestyle behaviour influences both the onset and progression of mental illness. By making lifestyle part of the treatment, physical and mental health, functioning and quality of life can improve in people with mental health problems. This is a hopeful prospect, especially for groups that do not benefit sufficiently from psychotherapy or medication or who suffer from recurring and comorbid symptoms. An integrated approach, focusing on multiple lifestyle factors, embedded in long-term guidance by qualified professionals and supported by social engagement, has the best chance of success. It is essential that interventions take into account personal barriers, mental health symptoms and structural challenges such as stigma, social inequality or limited access to appropriate care. Lifestyle can have both a protective and restorative effect in this regard. Additional research is needed into implementation in daily practice, including effectiveness in specific target groups (such as young people or people with severe mental health conditions), the role of mechanisms of action, digital applications and cost-effectiveness. Nevertheless, there is already sufficient knowledge about the adverse effects of unhealthy lifestyles and the effectiveness of interventions for common mental disorders to structurally integrate lifestyle into mental health care.

4. Health perspective: maintaining health

Health is often associated with the absence of disease, but in practice many people can experience good health despite having symptoms, conditions or chronic diseases. For these people, the focus is not always on complete recovery, but on functioning optimally within their capabilities. Lifestyle medicine can play an indispensable role in maintaining health despite limitations.

The health perspective requires an approach that not only treats symptoms but also helps people to organise their lives in a way that supports their autonomy, maintains their resilience and enables them to function on a daily basis. This requires a greater focus on health and lifestyle in healthcare. But just as important is to support people in their own environment or neighbourhood. To this end, healthcare providers need to know which support workers or facilities are available in the social domain and be supported in referring people to them. Healthcare providers must also understand how they themselves can support people in changing their behaviour and, for example, seize 'teachable moments' to have a conversation about lifestyle.

4.1 Wider use of lifestyle interventions to maintain health and resilience

The conditions and implementation of lifestyle interventions currently tend to focus on being overweight or obese. Although relevant, this narrows and undermines the broader potential of lifestyle change. Based on all the scientific evidence summarised in this knowledge bundle, we can conclude that lifestyle interventions also frequently have an effect on many other conditions and on outcomes such as **quality of life, physical and psychosocial functioning, mental health outcomes, social connectedness and reintegration**. These are outcomes that are very important and have a major impact at both the individual and societal levels. Shifting the perspective to lifestyle improvement as the primary goal of lifestyle interventions – from which multiple health outcomes are possible – would increase the effective and efficient use of lifestyle interventions and thus increase their impact.

In addition to this, efforts can be made to maintain patients' resilience and brain health: the optimal functioning of cognitive, emotional and social functions. Within this domain, **cognitive resilience**, the brain's ability to compensate for functional loss despite neuropathology, is receiving increasing attention. A growing body of research shows that lifestyle factors such as exercise, cognitive stimulation, social interaction, nutrition and sleep can strengthen cognitive resilience, especially when started early (Livingston et al., 2024; Yaffe et al., 2024). Positive effects are also visible in people with early symptoms or an increased risk. In the SMARRT study, a personalised approach in older people led to improvements in cognition, risk profile and quality of life. The FINGER study showed similar effects in people with cardiovascular risk factors (Ngandu et al., 2015). However, robust evidence is still limited. Multidomain interventions generally have small to moderate effects on mild disorders. Combinations of physical activity and cognitive training appear to be the most consistently effective (Sommerlad et al., 2024). Social interaction and mental activity also appear to be independent protective factors for cognitive decline and may contribute to the development of alternative neural networks (Barnes & Yaffe, 2011; Devranis et al., 2023). Mental flexibility, adaptive behaviour and providing a sense of meaning are possible supporting psychological components that can be reinforced through behavioural therapy or coaching.

4.2 Increasing the role of lifestyle in healthcare

In order to provide good care from a health perspective, it is essential that the connection between healthcare, the social domain and the living environment is organised and promoted. We are seeing various developments in this area.

Leefstijl(zorg)loketten

In hospital care, various barriers are encountered when referring patients to lifestyle interventions, such as the lack of clear referral options and a lack of integration into care processes (te Loo et al., 2024). At the same time, there are also facilitating factors that can make referring to such interventions easier, such as well-established cooperation and a central place for lifestyle care within the organisation. These barriers and accelerators are also reflected in primary care.
It underlines the need for a structural approach to lifestyle within the organisation and for more organisational interventions that focus on the 'how'. A current development in this area is 'lifestyle (care) desks'. These desks are increasingly being set up in hospitals, but also in neighbourhoods. A lifestyle (care) desk can act as a central link between healthcare and the social domain, making lifestyle interventions more accessible and efficient (te Loo et al., 2024; van Dijk et al., 2023). According to the LOFIT (Lifestyle Front Office For Integrating Lifestyle Medicine in the Treatment of Patients) model developed in a number of hospitals, such a desk can bridge the gap between hospital care and community-based interventions, giving patients better access to structural support for lifestyle changes. Various hospitals are now investigating the lifestyle (care) desk approach and working on outcome monitoring, implementation and sustainable financing (AmsterdamUMC, 2025; LOFIT consortium, n.d.; Netherlands Federation of University Medical Centres, n.d.).

Waiting time becomes preparation time

In recent years, there has been increasing attention on the use of lifestyle interventions at times when patients are 'waiting' for treatment in healthcare. This happens in mental healthcare, among other areas, but we see many examples of it in relation to operations in particular. The latter is often referred to as 'prehabilitation': an approach that improves the physical, mental and nutritional status of patients before surgery. This can reduce complications, speed up recovery and reduce the chance of the disease returning.

Recent studies show that personalised multimodal programmes surrounding surgery, involving exercise, nutrition and mental support, are particularly effective in complex conditions such as colorectal or pancreatic cancer (Berkel et al., 2022; Wijma, Hoogwater, et al., 2023). Even in serious conditions such as liver and pancreatic diseases, home-based support appears to be feasible and beneficial (Hildebrand et al., 2023; Jetten et al., 2022). Important success factors include preoperative physical activity, nutrition, smoking cessation and attention to comorbidities such as diabetes or iron deficiency (Wijma et al., 2024; Wijma, Eisenga, et al., 2023). These programmes improve the condition of people living with cancer, which can lead to fewer complications and better treatment outcomes. Although not everything has been proven yet, there are strong indications that lifestyle interventions strengthen the immune system and improve the prognosis (effect on survival and recurrence) of people with cancer (Booth et al., 2025; Rayner et al., 2025; Xu et al., 2025). However, more evidence is needed before lifestyle interventions around cancer surgery become a standard part of care.
In addition to personalised multimodal programmes, it is generally important to inform people who are scheduled for surgery about the importance of a healthy lifestyle in the period before, during and after the procedure so that they know what they can do themselves.

The importance of reliable (digital) information

Research conducted by the Lifestyle in Healthcare Coalition among patients shows that people have a clear need for reliable and accessible information about the role that a healthy lifestyle can play in preventing conditions and/or during their treatment or recovery. Patients indicate that they already search for a lot of information themselves, but often find too little relevant and useful information (Lifestyle in Healthcare Coalition, 2025). At the same time, there is a lot of unreliable information available on the internet. The importance of reliable (digital) information should not be underestimated. It is also important that this information is consistent and unambiguous.

The healthcare sector can play an important role in this by providing reliable and clear information in all communications from the healthcare sector, including sources such as Thuisarts.nl, leaflets from hospitals and patient organisations, as well as knowledge centres such as the Netherlands Nutrition Centre and the Trimbos Institute. Only by providing uniform, understandable and accessible information at all these levels can patients be effectively supported in making healthier lifestyle choices and taking control of their own health.

Encourage the use of proven tools and resources

Quitting smoking is one of the most impactful lifestyle interventions in curative care. It is known that quitting before surgery reduces post-operative complications and promotes wound healing; in cardiovascular and respiratory disorders, it reduces the risk of events and improves functioning. Various tools and aids to stop smoking have already been developed and are available in healthcare. It is important to encourage their implementation, for example by systematically asking about smoking status, using Very Brief Advice Plus (VBA+), offering reimbursed behavioural and pharmacological support, and explaining the relationship between smoking and symptoms and any planned (surgical) treatment. Notifications in information systems (e.g. EPD trigger for surgery indication or lung/vascular diagnoses) can also ensure the provision and follow-up of these services.

In order to support healthcare professionals in their efforts to promote healthy lifestyles, it is also important to clearly organise the available tools and instruments. Since 2024, general practitioners have been able to consult the practical guide 'Leefstijlbegeleiding in de huisartsenpraktijk' ('Lifestyle counselling in general practice') published by the Dutch College of General Practitioners (NHG) for practical tips on how to incorporate lifestyle discussions into their consultations (Dutch College of General Practitioners, n.d.). Among other things, this guide provides general practitioners with tools for initiating a lifestyle discussion and for motivational conversations. It also offers an overview of tools that are helpful for both the healthcare provider and the patient.

A healthy care environment

More and more healthcare organisations are aware of their exemplary behaviour as an environment. There are some excellent examples, particularly in the areas of nutrition, smoking and exercise.

One example is 'Goede Zorg Proef Je' ('A Taste of Excellent Healthcare'), a best practice from the National Prevention Agreement (Alliance for Nutrition in Healthcare, n.d.-b). This programme aims to promote healthy and sustainable food options in hospitals and healthcare institutions for patients, staff and visitors. This is because healthy food contributes to patient recovery and a healthy lifestyle for both visitors and staff. The programme supports hospitals and healthcare institutions with various resources, such as a learning network and a toolkit.

The National Prevention Agreement stipulates that the entire healthcare sector must be smoke-free by 2030. To support healthcare institutions in this endeavour, the Smoke-Free Healthcare programme was launched in collaboration with the Trimbos Institute and many other parties (Smoke-Free Healthcare, n.d.; Trimbos

Institute, n.d.). The accompanying website shares good examples, as well as a toolkit with materials and videos. This enables healthcare institutions to become smoke-free without having to reinvent the wheel.
The Knowledge Centre for Sport & Physical Activity has developed many tools for healthcare organisations and professionals to encourage exercise (Knowledge Centre for Sport & Physical Activity, n.d.). These include waiting room videos to inform patients while they wait for appointments. Hospitals have also launched initiatives to adapt the physical environment in wards to encourage exercise.

4.3 Starting points for healthcare professionals

Individual healthcare professionals can make an important contribution to improving patients' lifestyles. There are various starting points and insights they can use.

Three starting points for behavioural change

In practice, it can be helpful for healthcare providers to distinguish between three starting points for lifestyle change.

- **The first starting point** is a person with no intention of changing their behaviour. This may be due to risk assessment, low confidence that the behaviour will yield results, low confidence in their own abilities, (lack of) social support or trigger to take action. In addition, lifestyle may be lower on the list of priorities because other problems or concerns dominate their attention.
- **The second starting point** is someone who does have the intention to change but fails to translate this into behaviour. This may be because other goals are given priority, leaving no room for this new goal and it fades into the background. It may also be a result of procrastination because the investment has to be made now, but the benefits of the behavioural change are uncertain and lie in the future.
- **The third starting point** is someone who knows how to translate their intention to change into behaviour. But they also need to be able to maintain that behaviour. Here, it is important to consider how motivated people are, how good they are at self-regulation (their own strategies for change) and forming new habits, what their physical and mental capacity is, and whether they have a supportive social and physical environment.

Many interventions take these factors into account and respond to them. As a healthcare professional, it is advisable to take the patient's starting point into account when offering help: no intention, converting intention into behaviour, or maintaining behaviour (National Institute for Public Health and the Environment, 2020).

Take health literacy and context into account

Health literacy is essential to promoting health equity and reducing socio-economic health inequalities. This term refers to people's ability to find, understand and apply health information when making decisions that benefit their health. People with limited health literacy often have difficulty understanding medical information, such as package inserts, treatment plans and advice from healthcare providers. They also experience problems accessing appropriate care and taking preventive measures, such as eating healthily, getting enough exercise or recognising early signs of illness. These challenges increase the risk of an unhealthy lifestyle, poor self-care and suboptimal use of healthcare facilities, which contributes to the growth of health inequalities.
In addition to health literacy, an individual's social and economic context plays a crucial role in their ability or inability to change their lifestyle. Stress caused by factors such as job insecurity, financial problems or poor living conditions makes it difficult to make healthy choices and hinders the ability to deal effectively with health information.

Despite extensive knowledge about the above, many health interventions and prevention campaigns are insufficiently tailored to the varying levels of health literacy within the population and their socio-economic context. Interventions mainly focus on the average citizen, which means that vulnerable groups are often less well reached and do not benefit sufficiently from these efforts. This emphasises the need for targeted and accessible information, taking into account the diverse needs and capabilities of different population groups (Lifestyle4Health, 2022; Pharos, 2019).

Take advantage of teachable moments

The healthcare environment influences the behaviour of individuals and groups. Healthcare providers, such as doctors and nurses, are in a unique position to effectively convey lifestyle advice and influence social norms, such as smoking, due to their expertise and authority. Important life events, such as a change in medication or an operation, create valuable opportunities to promote lifestyle change (McBride, 2003). During these 'teachable moments', patients are often vulnerable but also receptive to change, especially when a healthier lifestyle contributes to their recovery. Research shows that many patients are motivated to take action, especially when healthcare providers actively discuss lifestyle at such moments. Even a brief conversation about the role of lifestyle in relation to symptoms can have a significant positive effect, especially when supplemented with further guidance. Moreover, many patients are capable of making changes themselves as long as they receive a little support (Brust et al., 2020). By making targeted use of these moments, healthcare professionals can play an important role in promoting sustainable lifestyle improvements. Hospital admissions and diagnoses of cardiovascular disease are examples of unique teachable moments when patients are particularly receptive to lifestyle advice (Brust et al., 2024). Patients often experience these moments as wake-up calls, with the seriousness of their situation motivating them to live healthier lives. From the patient's perspective, the timing of the advice is essential, as is empathetic communication by healthcare providers. Strategic use of these teachable moments in hospitals and in healthcare in general can increase awareness of the relationship between lifestyle and health and lead to a higher chance of sustainable behavioural change.

5. Conclusions and recommendations

As discussed in previous chapters, lifestyle influences the course of many chronic diseases through shared underlying systems and mechanisms. A long-term unhealthy lifestyle can damage these systems, reducing their capacity or disrupting their communication with each other. This, in turn, can lead to symptoms and diseases. Conversely, a healthy (or healthier) lifestyle can contribute to maintaining or restoring health. In this chapter, we make recommendations based on the insights from previous chapters.

5.1 The added value of lifestyle from a disease perspective

Chapter 3 describes the effects from a disease perspective. We summarise this briefly below:

- **Type 2 (pre)diabetes**: proven effective lifestyle programmes lead to weight and fat loss and, as a result, improve insulin sensitivity. This also results in an increase in quality of life and perceived health among participants.
- **Obesity**: recognised combined lifestyle interventions (gecombineerde leefstijlinterventies, GLIs) are available, particularly for people with class I obesity, which help with lifestyle improvement, weight loss and improved quality of life. However, these GLIs are still underutilised by people with low socioeconomic status and by people who are overweight in combination with risk factors and/or metabolic syndrome.
- **Cardiovascular disease**: lifestyle interventions improve endothelial function, inflammation markers, lipid profile and blood pressure, among other things. There is strong evidence for lifestyle interventions in the primary prevention of cardiovascular disease, but this also supports the reasoning for lifestyle interventions in secondary prevention.
- **Cancer**: observational studies in particular show that an improved lifestyle, especially physical activity, has a beneficial effect on life expectancy, quality of life and comorbidity. For hard disease outcomes, such as recurrence, metastasis and cancer-specific survival, there is still limited evidence available as few randomised trials have been reported.
- **Musculoskeletal system**: lifestyle helps limit symptoms and improve functioning. The evidence is strongest for osteoporosis and sarcopenia: exercise and good nutrition contribute to maintaining bone and muscle mass and reducing the risk of falls and fractures. In cases of osteoarthritis and rheumatoid arthritis, exercise, weight loss and a plant-based diet mainly help to improve quality of life, reduce pain and stiffness. In addition, fall prevention programmes can be used to alleviate fear of falling and improve stability in older people.
- **Neurodegenerative disorders**: there is strong evidence that lifestyle interventions contribute to maintaining cognitive functioning or slowing cognitive decline in neurodegenerative disorders, particularly in cases of mild symptoms. They also contribute to overall resilience and improved health in people with early-stage dementia symptoms.
- **Mental disorders**: a healthy lifestyle improves physical and mental health, functioning and quality of life. An integrated approach is most promising. There is already sufficient knowledge about both the harmful effects of an unhealthy lifestyle and the beneficial effects of lifestyle to structurally embed lifestyle in mental health care.

5.2 The added value of lifestyle from a health perspective

For people with a symptom, condition or illness, care is not always about cure but about functioning optimally within their own capabilities. This is in line with the broad definition of health: the ability to adapt and take control in the face of physical, emotional and social challenges. As described in Chapter 4, lifestyle plays a crucial role in this. It is widely known and proven that a healthier lifestyle contributes to a better quality of life, physical and psychosocial functioning, mental health, social connectedness and reintegration. These are outcomes that are very important and have a major impact at both the individual and societal levels.

In lifestyle development, the emphasis is now often placed on reducing overweightness and obesity and disease-specific outcomes. Although relevant and impactful, it is also essential in healthcare and the development of interventions to pay attention to the impact that lifestyle has on broader health, as described in Chapter 3. Outcomes such as employability and quality of life are important at both the individual and societal levels. The impact of lifestyle within and from healthcare is increased when these broader health outcomes are included in practice, policy, research and innovation.

5.3 Recommendations

There is ample and diverse evidence for the effectiveness of lifestyle interventions in preventing and treating various chronic conditions. At the same time, there is a great deal of knowledge about the adverse effects of an unhealthy lifestyle on the development of diseases.

Despite the growing evidence, the implementation of lifestyle interventions in and from healthcare lags behind in practice. Structural changes are necessary to embed lifestyle as an equal part of appropriate care:

Implement what works

Implementation is still lagging behind, despite the evidence already available and despite lifestyle being part of many guidelines. There is still too much talk about health and lifestyle not fitting into current systems and working methods and about the need for more scientific evidence in the context of specific treatments. Meanwhile, more and more **patients want to know what they can do themselves** and more and more **healthcare providers want to support patients in this in an appropriate manner**. Moments when people are or become involved in healthcare – for example, when receiving a diagnosis, a change in medication, an operation or placement on a waiting list – are often life-changing. It is precisely these teachable moments that offer valuable opportunities to discuss and encourage lifestyle changes. At such moments, people are often extra motivated to make choices that benefit their health, especially when healthcare providers actively support this.

Patients need clear and easily accessible information about lifestyle so that they feel supported in making healthier lifestyle choices and can take more control of their own health. They are already looking for this information but find it insufficient. In addition, they need appropriate guidance during treatment and recovery.

In many cases, this guidance can be provided outside of healthcare, at home and in the social domain. **Healthcare professionals** must be equipped during their training, and through guidelines and policies within the organisation, to conduct lifestyle discussions effectively. This means that they can decide together with the patient which lifestyle interventions are appropriate and refer patients accordingly. Although guidelines often mention lifestyle, they still do not offer healthcare professionals sufficient scope for action. Moreover, interventions such as smoking cessation care or lifestyle discussions are still far from being a standard part of protocols or care pathways. And many healthcare professionals are unsure how to refer patients to support outside the healthcare system.
More generally, it is necessary to create a supportive environment in healthcare, for example with healthy food options, physical spaces that encourage movement, and a smoke-free environment.

Stop what doesn't work

In the transition to health and behaviour as part of appropriate care, it is essential to find a balance between implementation and de-implementation. While new interventions, such as lifestyle-oriented treatments, are being implemented, it is also necessary to phase out treatments or routines that add little to the quality of care or health outcomes. This process of de-implementation requires a critical evaluation of which care actually adds value from the perspective of the patient and society. The available resources can then be used more effectively for care options where they really make a difference. This balance between implementation and de-implementation requires collaboration between healthcare providers, policymakers and researchers based on current scientific insights and the wellbeing of the patient. Without this dual focus, we risk a healthcare landscape that becomes overcrowded, stalling the desired shift towards appropriate care.

Make lifestyle interventions accessible to everyone

To date, too many lifestyle interventions and prevention campaigns have failed to adequately address the varying levels of health literacy within the population. People with limited health literacy often have difficulty understanding medical information, experience barriers to accessing care, and find it difficult to apply preventive measures. As a result, they are at greater risk of an unhealthy lifestyle, poor self-care, and suboptimal use of healthcare facilities. Many interventions are also not sufficiently accessible and applicable for people with lower socioeconomic status. This means there is a high risk of increasing health inequalities if healthcare providers focus on lifestyle interventions that do not take into account diversity in health literacy. To ensure more equal opportunities in health, lifestyle interventions in and from healthcare must also be understandable, accessible and applicable to everyone – regardless of educational level, language skills or background. This requires extra attention, investment and opportunities to tailor interventions more effectively.

Work on appropriate research and evidence

Changes are also needed in the scientific context. For example, this bundle makes it clear that diseases are still often viewed in isolation. This is despite the fact that more and more people are struggling with more than one condition or disease with shared underlying mechanisms. When researching the added value of lifestyle, a disease-transcending approach can be particularly valuable. In line with this, we still see too much focus on randomised controlled trials (RCTs) and research with a strong focus on one or two outcome measures, with a lot of attention paid to 'if' something works and less to 'how' and 'why' interventions work, as well as too little or no attention paid to the question of which lifestyle factor(s) the patient themselves would like to work on. Although RCTs can be valuable in certain settings, practice shows that the evaluation of lifestyle interventions can be very

complex in order to align well with practice, which often makes an RCT unsuitable. In addition, people often have multiple conditions. All this leads to doubts about the applicability of existing interventions and to the repeated initiation of new studies, even though a great deal of knowledge is already available.
Furthermore, there is an uneven distribution of research funding: a great deal of private funding is available for pharmaceutical and medtech innovations, whereas lifestyle interventions attract hardly any private investment because there is no revenue model associated with them. This market failure calls for more public investment to develop the field of knowledge in a more balanced way.
A different perspective is needed on appropriate research and evidence for lifestyle interventions, as described in guidelines issued by the Lifestyle in Healthcare Coalition (Lifestyle in Healthcare Coalition, n.d.-b, n.d.-a). Furthermore, evidence that has already been gathered and existing knowledge should be applied much more broadly. In addition, it is also necessary for various parties to apply the same standards in the dialogue on appropriate evidence. Scientific associations often use GRADE criteria when drawing up and revising guidelines, which also allow for clinical expertise and patient preferences. These criteria do not always correspond to the assessment criteria of the National Health Care Institute. This mismatch slows down the implementation and upscaling of proven interventions.

Work from a systems approach

Lifestyle change is a systemic issue; there is no single solution nor is there any one party capable of implementing solutions. Not in healthcare nor in the wider living environment. Lifestyle within and from healthcare requires the active organisation of collaboration across domains and sectors. This applies at the level of individual professionals and daily appointments, as well as at the level of administrators and long-term strategy. Organisational interventions, such as lifestyle desks in hospitals, healthcare institutions or the neighbourhood, play an important role in this because they offer professionals and patients the preconditions to make the commitment to lifestyle concrete by referring to or starting a lifestyle intervention. Other important preconditions that are necessary are regional policy plans and financing models that promote inclusiveness and cooperation. A supportive living environment requires vision, policy and health in all policies. It also requires active cooperation between municipalities, policymakers, employers, welfare organisations, training institutions, citizen/patient organisations, healthcare organisations, etc.

5.4 Accelerating the transition together

The challenges facing healthcare today and tomorrow underscore the importance and urgency of the transition from illness and care to health and behaviour. With this knowledge bundle, the authors and parties involved want to confirm that focusing on lifestyle plays an important role in this. It offers significant opportunities to keep unavoidable healthcare accessible by preventing avoidable healthcare. This updated knowledge bundle shows that the scientific evidence for this is growing stronger every year. The bundle also makes it clear that lifestyle is not an individual task for a patient but that lifestyle must be structurally integrated into policy, healthcare and social environments.
In recent years, thanks in part to the Lifestyle in Healthcare Coalition, the Lifestyle4Health platform and other initiatives, major steps have been taken to make lifestyle a more integral part of curative care:

- More and more patients want to know what they can do themselves to be less ill and more and more healthcare providers are willing and able to support patients in this in an appropriate manner.
- More and more patients, healthcare professionals and scientific research are demonstrating that lifestyle is of great value.

- There is broad consensus among the IZA/AZWA parties about the urgency of focusing on lifestyle and there is movement within the system: healthcare providers are becoming involved and lifestyle is being given a permanent place in guidelines, policy and implementation.

The transition from illness to health is thus in the breakthrough or acceleration phase, but the tipping point has not yet been reached. Health and lifestyle are not yet a self-evident and integral part of healthcare.

The insights from this knowledge bundle emphasise that the transition must be actively promoted and accelerated: lifestyle has significant added value for people and society. It is necessary for all parties involved to move beyond the pilot and project phase. Lifestyle within and from healthcare must be integrally embedded in the system of appropriate care and in regional cooperation. The initiators of this bundle therefore call on patient organisations, healthcare professionals, healthcare organisations and policymakers to use the knowledge from this bundle for their own organisations and, at the same time, accelerate the transition together.

6. References

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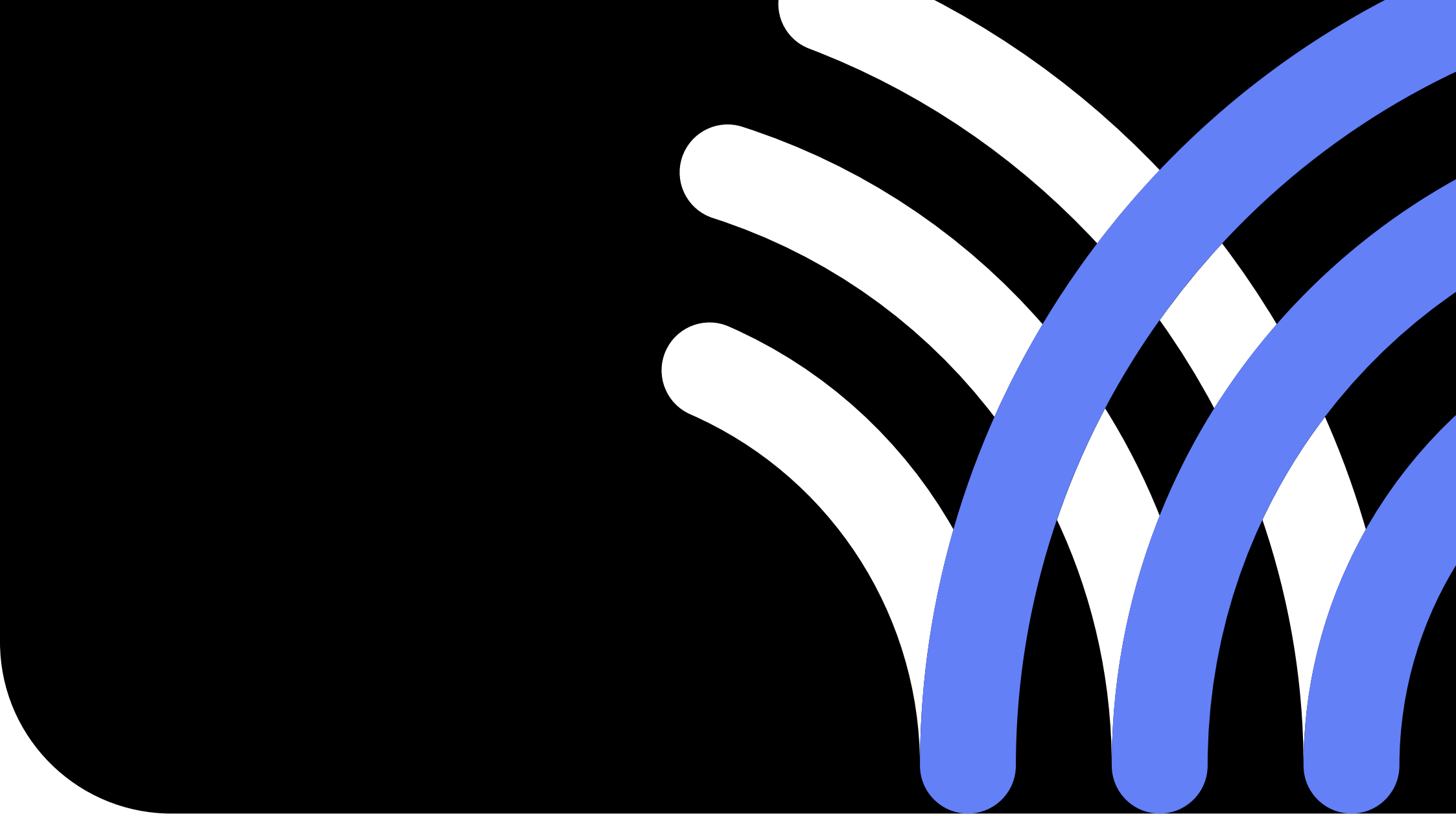

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